

TWENTY-FIFTH ANNUAL REPORT

TO HIS EXCELLENCY,
C. J. BELL, GOVERNOR OF VERMONT.

IN COMPLIANCE WITH SECTION 247, CHAPTER 21 OF THE GENERAL LAWS OF VERMONT, I HAVE THE HONOR TO SUBMIT HEREWITH THE ANNUAL REPORT OF THE BOARD OF AGRICULTURE FOR THE YEAR
ENDING JUNE 30TH, 1905.

GEORGE AITKEN, SECRETARY.



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MEMBERS
OF THE
STATE BOARD OF AGRICULTURE,
1905 and 1906.

HIS EXCELLENCY, C. J. BELL, Walden.

MATTHEW H. BUCKHAM, President University of Vermont and
State Agricultural College, Burlington,
Chairman.

GEORGE AITKEN, Woodstock, Secretary.

ERNEST HITCHCOCK, Pittsford.

DANA H. MORSE, Randolph.

AN ACT TO PROVIDE FOR THE PRINTING OF THE
REPORT OF THE VERMONT DAIRYMEN'S ASSO-
CIATION.

*It is hereby enacted by the General Assembly of the State
of Vermont:*

Section 1. Section two hundred and forty-seven of the
Vermont Statutes shall be amended so as to read as follows:

The Secretary shall prepare on or before the 30th day of
June annually, a detailed report of the proceedings of the Board
with such suggestions in regard to its duties and the advance-
ment of the interests herein specified as may seem pertinent, and
he may append thereto such abstracts of the proceedings of the
several agricultural societies, and farmers' clubs in the State as
may be advisable, and the report of the Vermont Dairymen's
Association. The report shall show under separate heads the
work of the Board relating to the different subjects herein men-
tioned.

Sec. 2. The provisions of section two hundred and fifty-
one of Vermont Statutes requiring the printing of a report by the
Vermont Dairymen's Association is hereby repealed.

Approved November 24, 1896.

CHAPTER 21.

BOARD OF AGRICULTURE.

Section
245. Members; vacancies.
246. Meetings.

Section
247. Report.
248. Statistical information.

Section 245. The Governor, the President of the Uni-
versity of Vermont and State Agricultural College, and three
other persons appointed by the Governor, and confirmed by the
Senate during each biennial session of the General Assembly and
who shall hold their office for the term of two years from and
after the first day of December in the year in which the ap-
pointment is made, shall constitute the Board of Agriculture for
the improvement of the general interests of husbandry, the pro-
motion of agricultural education throughout the State, and for
the discharge of such other duties as are hereinafter set forth;
vacancies in the Board shall be filled by the Governor. Said
Board shall appoint from its number a Secretary.

Sec. 246. The Board shall hold one meeting in each
county annually, and others if deemed expedient, and may em-

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ploy lecturers, essayists or other aid in conducting said meetings, managing its affairs generally and discharging its duties. At such meetings it shall present subjects for discussion, and among other topics forestry and tree planting, roads and road making.

Sec. 247. The Secretary shall prepare on or before the thirtieth day of June, annually, a detailed report of the proceedings of the Board, with such suggestions in regard to its duties, and the advancement of the interests herein specified as may seem pertinent; and he may append thereto such abstracts of the proceedings of the several agricultural societies and farmers' clubs in the State as may be advisable. The report shall show under separate heads the work of the Board relating to the different subjects herein mentioned.

Sec. 248. The Board shall collect authentic statistical information, as full as possible, relating to agriculture and agricultural products, farms and farm property, the manufacturing and mining industries of the State, which under a separate head, shall form a part of its annual report; and such information shall be complete as to unoccupied farms. The Board shall also publish such information in separate form showing by description and illustrations, the resources and attractions of Vermont; also the advantages the State offers and invitations it extends to capitalists, tourists and farmers; and shall distribute the same in such manner as, in its judgment, will be most effective in developing the resources and advertising the advantages of the State.

CHAPTER 183.

REGULATING MANUFACTURE AND SALE OF PROVISIONS.

MILK AND CHEESE.

Section		Section	
	MILK AND CHEESE.	4337.	Victuallers using imitation not pink subject to penalty.
4327.	Milk, dilution or adulteration of, penalty for.	4338.	Analyses of specimens.
4328.	Standard in creameries, etc.	4339.	Warrants to search for imitation butter.
4329.	Samples tested for evidence.	4340.	"Butter" defined.
4330.	Disposition of samples.		LARD.
4331.	Standard milk defined.	4341.	All but pure fat of swine to be labeled "compound lard."
4332.	Fraudulent marking of butter and cheese.	4342.	Penalty for selling unmarked.
4333.	Jurisdiction of justice.		MAPLE SUGAR AND HONEY
	IMITATION BUTTER AND CHEESE.	4343.	Penalty for adulterating maple sugar and honey.
4334.	Manufacture of prohibited.		
4335.	Penalty.		
4336.	Imitation of butter sold to be colored pink; penalty.		

Section 4327. A person who sells or furnishes, or has in his possession with intent to sell or furnish, milk diluted with

water, adulterated or not of good standard quality or milk or cream which has been treated with chemicals, shall for each offense, be fined not more than three hundred dollars and not less than fifty dollars, and any person who sells or offers for sale or furnishes milk from which the cream or any part has been taken or keeps back part of the milk known as "strippings" without the full knowledge of the person to whom such milk shall be sold or offered for sale or furnished shall for each offense, be fined as previously provided for in this section in cases of adulteration.

Sec. 4328. In all creameries and cheese factories in this State milk containing four percent. of butter fat shall be the standard used as a paying basis.

Sec. 4329. Where, in prosecutions under the preceding section the ordinary means of proof are not available or sufficient, sealed samples of the milk sold or furnished, or kept with intent to be sold or furnished, taken from such milk in the presence of at least one disinterested witness and with the knowledge and in the presence of the person or his agent or servant so selling or furnishing, or having in his possession with intent to sell or furnish, said milk may be sent to the state agricultural experiment station to be tested; the result of such test shall be deemed competent evidence in such prosecutions, but shall not exclude other evidence.

Sec. 4330. Said samples shall be placed in tin or glass vessels securely sealed with a label thereon stating the time when, place where, the sample was drawn, from whose milk taken and signed by the person taking the same and by one or more disinterested witnesses. Upon request a like sample shall be given to such person, his agent or servant, for which a receipt shall be given to the person taking or drawing the same.

Sec. 4331. Standard milk shall contain not less than twelve and one-half percent of solids, or not less than nine and one-fourth of total solids exclusive of fat, except in the months of May and June, when it shall contain not less than twelve percent. of total solids. This rule shall govern tests made at the experiment station, and an officer or employee thereof found guilty of fraud in making tests shall be fined one thousand dollars.

Sec. 4332. A person who marks or otherwise designates or causes to be marked or otherwise designated as "creamery" butter or cheese, or the package in which it is contained, when such butter or cheese is not manufactured at a creamery, or sells or offers to sell any such butter or cheese so marked, shall be fined not more than three hundred dollars and not less than fifty dollars.

Sec. 4333. Justices shall have concurrent jurisdiction with the county court in prosecutions under the four preceding sections.

IMITATIONS OF BUTTER AND CHEESE.

Sec. 4334. No person by himself, his agent, or servant, shall manufacture out of animal fat, or animal or vegetable oils not produced from unadulterated milk or cream, any article in imitation of butter or cheese, or mix with or add to milk, cream or butter any acids or other deleterious substances, animal fats, or animal or vegetable oils so as to produce an article in imitation of butter or cheese.

Sec. 4335. If a person violates the provisions of the preceding section he shall be fined not more than three hundred dollars, and not less than one hundred dollars, or be imprisoned for not more than one year and not less than six months for the first offense; and for each subsequent offense shall be fined not more than one thousand dollars and not less than three hundred dollars or imprisoned for one year. One-half of the fine shall go to the complainant.

Sec. 4336. If a person by himself, his agent, or servant, sells, exposes for sale, or has in his possession with intent to sell, any article made in imitation of butter, that is of any other color than pink, shall, for every package sold or exposed for sale, be fined fifty dollars, and for each subsequent offense one hundred dollars. One-half of the fine shall go to the complainant.

Sec. 4337. If a proprietor or keeper of a hotel, restaurant, boarding house, eating saloon or other place where food is furnished to persons paying for the same, places upon the table or has in his possession with intent to use, any article made in imitation of butter, that is of any other color than pink, he shall be fined fifty dollars for the first offense, and for each subsequent offense one hundred dollars. One-half of the fine shall go to the complainant.

Sec. 4338. The complainant may cause specimens of suspected butter or cheese to be analyzed or otherwise tested as to color and compounds; the expense of such analysis or test not exceeding twenty dollars, in any case, may be included in the cost of prosecution.

Sec. 4339. A justice of the peace may issue a warrant for searching, in the day-time, any store, hotel, boarding-house, or other place where oleomargarine, butterine, or other substance imitating butter or cheese is suspected to be kept or concealed, when the discovery of such article may tend to convict a person

of any offense under the five preceding sections. No warrant shall be issued except upon the oath of some person that he has reason to suspect and does suspect that such article or articles are kept or concealed in the place to be searched.

Sec. 4340. The term "butter" shall mean the product usually known by that name, manufactured exclusively from milk or cream or both, with or without salt or coloring matter.

LARD.

Sec. 4341. No person by himself, his agent or servant, shall prepare, sell or expose for sale lard or any substance intended for use as lard, which contains any ingredients but the pure fat of swine, in any tierce, bucket, pail or other package under a label bearing the words "pure," "refined," or "family," alone or in combination with other words, unless the package containing the same bears upon the outside thereof, in letters not less than one-fourth of an inch long, the words, "Compound Lard."

Sec. 4342. A person violating the provisions of the preceding section shall be fined not more than fifty dollars for each offense.

MAPLE SUGAR AND HONEY.

Sec. 4343. A person who adulterates maple sugar, maple syrup, or bees' honey with cane sugar, glucose, or any substance whatever for the purpose of sale or knowingly sells maple sugar, maple syrup or bees' honey that has been adulterated, shall be punished by a fine of not more than two hundred dollars and not less than fifty dollars for each offense; one-half of such fine shall go to the complainant.

NO. 143.

AN ACT PROVIDING FOR THE INSPECTION OF FOOD, DRUGS AND OTHER ARTICLES IN COMMON USE.

Section	Section
10. Sale of calf less than four weeks old.	11. Inspection of carcasses by health officers.
	12. Sale of unwholesome meat.

It is hereby enacted by the General Assembly of the State of Vermont:

Sec. 10. Whoever kills, or causes to be killed, for the purpose of sale for food, a calf less than four weeks old, or know-

ingly sells, or has in possession with intent to sell, for food, the meat of any such calf, shall be imprisoned not exceeding thirty days, or fined not more than fifty dollars, or both.

Sec. 11. The health officer of any city, town or village may inspect the carcasses of all slaughtered animals intended for food for men, and all meat, fish, vegetables, produce, fruit or provisions of any kind found in their cities or towns, and for such purposes may enter any building, enclosure or other place in which such carcasses or articles are stored, kept or exposed for sale. If, on such inspection, it is found that such carcasses or articles are designed for food for man and are tainted, diseased, corrupted, decayed, unwholesome, or from any cause, unfit for food, the board of health shall seize the same and cause it or them to be destroyed forthwith, or disposed of otherwise than for food. The powers conferred in this section upon local health officers, are conferred upon any member of the state board of health to perform the same acts in any part of the state.

Sec. 12. Any meat, unwholesome provisions or articles sold, kept or offered for sale for food or drink for human beings, and any articles adulterated in violation of any of the preceding sections, shall be deemed a public nuisance and summarily destroyed.

NO. 15.

AN ACT TO PROMOTE THE HORTICULTURAL INTERESTS OF VERMONT.

Section	Section
1. \$500.00 appropriated annually.	5. Deduction of appropriation
2. Payment of appropriation.	through injudicious expenditure.
3. Annual meeting, premiums.	6. Report of secretary.
4. Report to auditor of accounts by the secretary.	

It is hereby enacted by the General Assembly of the State of Vermont:

Section 1. The sum of five hundred dollars (\$500.00) is hereby appropriated annually to the Vermont state horticultural society for the purpose of promoting, encouraging and developing the horticultural interests of the state.

Sec. 2. The auditor of accounts is hereby directed to draw an order on the state treasurer in favor of the treasurer of the Vermont state horticultural society for the first payment of this appropriation on the second day of January, 1905, and annually thereafter so long as the conditions hereinafter provided shall be complied with.

Sec. 3. Said Vermont state horticultural society shall hold an annual meeting, of at least two days' duration, at some town or city in this state which is easy of access to the people and in some convenient and suitable building. At said meeting men of horticultural note shall be engaged to teach and discuss the best methods of fruit, vegetable and flower culture, as well as the handling and marketing of the product. At the said annual meeting premiums not to exceed one hundred dollars shall be offered for the best exhibits of fruits, vegetables and flowers, said premiums to be awarded by disinterested and expert judges, and paid by the treasurer of the Vermont state horticultural society.

Sec. 4. The secretary of the Vermont state horticultural society shall on or before December 1, 1905, and annually thereafter, make a detailed and itemized account to the state auditor of accounts of the receipts and expenses of said society which accounts shall be approved and countersigned by the treasurer and auditor of said society.

Sec. 5. If in any year it shall appear to the state auditor of accounts that any part of the preceding annual appropriation has been injudiciously expended, then such part or amount may be deducted from the order for the ensuing annual appropriation.

Sec. 6. The report of the annual meeting of the Vermont state horticultural society shall be published by the state board of agriculture in their annual report as provided in section two hundred forty-seven of Vermont Statutes.

Sec. 7. This act shall take effect from its passage.

Approved December 9, 1904.

NO. 16.

AN ACT RELATING TO THE PRESERVATION OF FORESTS.

Section

1. Forestry commissioner.
2. Report of commissioner.
3. First selectman to be forest fire warden, duties of, expenses of.
4. Fire warden, powers of, expenses.
5. Penalty for leaving fire in woods.

Section

6. Posting of notices.
7. Report of fire wardens.
8. Bulletins regarding control of forest fires.
9. Control of fires kindled for burning brush.
10. Penalty for violation of act.

It is hereby enacted by the General Assembly of the State of Vermont:

Section 1. The governor of the state shall, within ten days after the appointment, and confirmation by the senate, of the members of the board of agriculture, designate one of said mem-

bers to act as forestry commissioner of the state of Vermont. It shall be the duty of the member of the board of agriculture so designated to perform all acts and duties hereinafter required of the forestry commissioner during his term of office as member of the board of agriculture.

Sec. 2. The forestry commissioner shall biennially, on or before the first day of July in the year in which the legislature meets, report to the governor his acts under this law, the material facts he may have ascertained and such recommendations as he deems pertinent. Such report shall be printed in the report of the secretary of the board of agriculture.

Sec. 3. The first selectman in each town shall be, and is hereby constituted, forest fire warden in and for his town. The services of such selectman while acting as fire warden shall be paid for by the town at the same rate as he is paid for his other official services. It shall be the duty of the forest fire warden of a town in which a forest fire is discovered to take such measures as may be necessary for its prompt control and extinguishment. For this purpose he may call upon any person in the town for assistance, and persons so assisting shall be paid by the town at the rate of fifteen cents per hour. But no town shall be held liable in any year for an amount greater than five per cent. on its grand list for the purpose of extinguishing forest fires. Expenditures in any town for the purpose of extinguishing forest fires in excess of the amount above authorized shall, if authorized by the state forestry commissioner be paid by the state. On receipt of the bills for such expenses duly approved by the forestry commissioner, the auditor shall draw an order for same which shall be paid by the state treasurer out of the general funds of the state. If any person called upon by a forest fire warden for assistance, and not excused for good reason, fails or refuses to so assist he shall be fined not exceeding ten dollars.

Sec. 4. The state forestry commissioner may in his discretion appoint for any unorganized town or gore a fire warden who shall hold office for one year from the date of his appointment and who shall have the same powers and duties as a town fire warden and may also call for assistance on persons not residents of the unorganized town or gore in question. Expenses incurred by fire wardens for such unorganized towns and gores in extinguishing forest fires, shall on approval of the forestry commissioner, be paid by the state. No bills, however, in any one such town or gore shall exceed one hundred dollars in a single year.

Sec. 5. Any person or persons who builds a fire in or adjoining any woods in this state shall, before leaving the same, totally extinguish such fire. Any person failing to comply with

this section shall be fined not more than fifty dollars, or imprisoned not more than thirty days, or both.

Sec. 6. The forestry commissioner shall have printed upon cloth in large letters notices containing proper warning as to danger of forest fires and containing the provisions of the preceding section. These notices shall be furnished to all fire wardens in the state who shall post them in suitable places. These notices may also be furnished to private landowners.

Sec. 7. The fire wardens shall keep a record of all acts done by them under this law, of the amount of expenses incurred, of the number of fires, their causes, the areas burned over and the character and amount of damage done by forest fires in their jurisdiction. Once a year during the month of January they shall report to the state forestry commissioner these facts on blanks to be furnished by him.

Sec. 8. The state forestry commissioner may prepare or have prepared bulletins or circulars treating of forest fires, their prevention, the best methods of controlling and extinguishing the same, the laws of the state on the subject, the care of woodlands, the best methods of lumbering, the promotion and preservation of forest growth and kindred subjects, which circulars and bulletins may be printed and circulated at the expense of the state, and may be included in the printed report of the secretary of the board of agriculture.

Sec. 9. Fires kindled for the purpose of burning brush or for other lawful purpose must only be kindled at such times and under such conditions as will enable the parties starting them to keep them entirely under control.

Sec. 10. Any officer neglecting to perform the duties imposed on him by this act, any person wilfully tearing down or defacing any notice posted up under the provisions of this act, and any person disobeying any provision of this act for which a penalty is not otherwise provided shall be fined not more than ten dollars for each offense. It shall be the duty of the fire warden in each town to enter complaint before the town grand juror or other proper officer against any person guilty of an offense against the provisions of this act.

Approved December 9, 1904.

NO. 17.

AN ACT TO ENCOURAGE PLANTING AND PERPETUATING FORESTS.

Section

1. Exemption of waste land from taxation.
2. Forestry commissioner to issue rules for planting waste lands.
3. Certificate of planting waste lands filed in town clerk's office.

Section

4. Duty of listers.
5. Violation of regulations by owner of land, revocation of certificate.
6. Report to legislature.

It is hereby enacted by the General Assembly of the State of Vermont:

Section 1. All waste or uncultivated land which shall be planted with timber of forest trees under the provisions and regulations as provided in this act shall be exempt from taxation for a term of ten years, commencing on the first day of April in the second year after such lands shall have been so planted as herein provided.

Sec. 2. The state forestry commissioner if there shall be such an officer, otherwise the state board of agriculture, shall issue and promulgate rules and regulations for the planting of waste or uncultivated land with timber or forest trees, shall in such rules and regulations fix the minimum number to be planted to the acre, the kinds of trees to be planted, the time of year when the same shall be done and how proof thereof shall be made to such commissioner or board; shall make regulations for the care and preservation of such planted trees during the term of exemption and shall furnish a printed copy of such rules and regulations to any person applying for the same.

Sec. 3. Immediately upon receiving proof according to the rules and regulations so made of the planting of any waste or uncultivated land with timber or forest trees, said commissioner or said board shall furnish to the town clerk of the town where such land is situated a certificate of such planting, describing therein the land so planted, and the exemption from taxation herein provided shall be from the first day of April in the second year after such certificate is filed.

Sec. 4. The listers of any town in apportioning the grand list of any year shall note therein the exemption of any lands in said town under the provisions of this act.

Sec. 5. If the owner or occupant or occupants of such exempt land shall, at any time, during the period of such exemption, forfeit or knowingly permit to be forfeited any of the rules or regulations of the forestry commission or state board of agriculture regarding the replanting or care and preservation of the

timber of forest trees so planted, the said commissioner or board shall revoke the certificate of exemption filed as provided in section 3 of this act and shall give notice of such revocation in writing to the town clerk of the town where the lands are located, which notice so filed shall operate to abrogate and annul such exemption from thence forward.

Sec. 6. The said commissioner or said board shall make an annual report to the legislature of all doings under this act, with a detailed statement of the exemptions granted thereunder.

Approved December 7, 1904.

NO. 146.

AN ACT IN AMENDMENT OF NO. 85 AND NO. 86 OF THE ACTS OF 1902, RELATING TO THE BOARD OF CATTLE COMMISSIONERS.

Section	Section
1. Quarantine of animals by the board.	4. Compensation of board.
2. Penalty for violating order of board.	5. Report to governor.
3. Valuation of animals killed.	6. Repeal of inconsistent acts.
	7. Takes effect from passage.

It is hereby enacted by the General Assembly of the State of Vermont:

Section 1. Section 2 of No. 85 of the acts of 1902 is hereby amended so as to read as follows:

Sec. 2. The board of cattle commissioners shall have authority to prohibit the importation of cattle or other domestic animals into this state when they have reason to suppose that such animals are affected with or have been exposed to any contagious disease. Such animals may be quarantined in such manner and for such time as the public good may require. The expenses incident to such quarantine and any examination that may be required shall be paid by the owner of said animals. Nothing in this section shall apply to a person transporting cattle through the state on the cars.

Sec. 2. Section 3 of No. 85, of the acts of 1902, is hereby amended to read as follows:

Sec. 3. If a person violates an order of the board of cattle commissioners after the same has been published three successive days in such newspapers published in this state as the board directs he shall be fined fifty dollars for each offense and any officer or agent of any company who violates said order shall be fined as aforesaid, and such importation of each separate animal shall constitute a distinct offense.

Sec. 3. Section 5 of act No. 85 of the acts of 1902, is hereby amended so as to read as follows:

Sec. 5. The value of all cattle or other domestic animals killed by order of the board of cattle commissioners shall be the actual selling value of the condemned animal at the time the examination is made. No reference being had to the result of such examination. The owner of the condemned animal and the commissioner in charge may agree upon such valuation. When unable to agree the owner and commissioner shall each appoint a disinterested person to appraise said animal. If these two persons cannot agree they shall select a third person to act with them and the appraisal of these three persons shall be final. In no case shall the value of a diseased animal be appraised at more than fifty dollars. The owner of the condemned animal shall receive eighty percent. of the appraisal. The condemned animal shall be disposed of as directed by the commissioner in charge. Within sixty days of date of disposal of animal the amount which the owner is entitled to receive shall be paid by the state to the owner of such animal upon the written order signed by the commissioner in charge and countersigned by the secretary of said board. No indemnity shall be paid to the owner of condemned cattle or other domestic animals that have not been kept or owned in the state six months previous to the discovery of such disease, nor shall indemnity be paid to persons who neglect or refuse to comply with the directions and orders of the commissioners in disinfecting their premises.

Sec. 4. Section 7 of No. 85 of the acts of 1902, is hereby amended to read as follows:

Sec. 7. Each member of the board of cattle commissioners shall receive four dollars per day for his services for each day actually spent in the performance of his duties and shall receive his actual expenses. The cattle commission shall have authority to employ such assistance as is necessary to perform the duties required in this act. All accounts of said board shall be audited by the state auditor and paid by the state.

Sec. 5. Section 9, of No. 85, of the acts of 1902, is hereby amended to read as follows:

The board shall keep a record of its doings and report the same to the governor annually, prior to the 15th day of September of the year in which the legislature convenes and sooner if required by him. Three thousand copies of the report shall be printed by the commissioners on state printing and distributed under the direction of the cattle commission.

Sec. 6. Sec. 2, Sec. 3, Sec. 5, Sec. 7 and Sec. 9 of No. 85, of the acts of 1902 and acts or parts of acts inconsistent with this act are hereby repealed.

Sec. 7. This act shall take effect from its passage.
Approved December 10, 1904.

NO. 153.

AN ACT FOR THE PROTECTION OF HORSES.

It is hereby enacted by the General Assembly of the State of Vermont:

Section 1. Any person knowingly watering or causing to be watered at a public trough or watering place, or feeding or causing to be fed or offering at a public stable for the purpose of hitching with other horses, any horse afflicted with the glanders or any other malignant disease, shall be fined not more than twenty dollars nor less than ten dollars for each offense.

Sec. 2. The selectmen of the town in which such horse is owned shall, upon complaint being made, or may, if aware of the fact, make an examination of the case and if necessary employ a veterinary surgeon at the expense of the town, and if it appears that the horse has the glanders or any other malignant disease, they shall cause the same to be killed at the owner's expense; but the selectmen shall receive the same compensation from the town as in the performance of other town business.

Sec. 3. This act shall take effect from its passage.

Approved December 9, 1904.

NO. 83.

AN ACT TO REGULATE THE SALE OF COMMERCIAL FERTILIZERS.

Section

1. Commercial fertilizer defined.
2. Importer defined.
3. Every lot of fertilizer offered for sale shall have printed statement of quality accompany it.
4. License fee of \$100 paid before sale; method and time of payment.
5. Expiration of licenses; manufacturer paying fee, agent not required to pay same.
6. Fees paid to state treasurer by director; treasurer to pay director expenses caused by performing duties imposed by this act.
7. No person to sell certain products as a fertilizer unless printed statement is affixed to package.

Section

8. Penalty for selling without printed statement.
9. Director of experiment station may enter premises where fertilizer is stored and take out sample.
10. Analysis of samples so taken.
11. Penalty for hindering director in discharge of his duty.
12. Director shall notify manufacturer of violation of this act; prosecution of manufacturer.
13. Brands of fertilizers distinct.
14. This act not to affect fertilizers used by individuals.
15. Sections 4346 to 4359 V. S. repealed.
16. Takes effect December 11, 1902.

It is hereby enacted by the General Assembly of the State of Vermont:

Section 1. The term "commercial fertilizer" as used in this act, shall be taken to mean compounds and manufactured substances containing, or represented as containing, two or more of the ingredients mentioned in section three of this act, but shall not apply to the separate ingredients used to manufacture the same, or to bone meal, land plaster, lime, or any substance the product of nature, which has not been compounded.

Sec. 2. The term "importer," as used in this act, shall be taken to mean all who procure or sell commercial fertilizers made in other states.

Sec. 3. Every lot or parcel of commercial fertilizer, sold, offered or exposed for sale in this state, the retail price of which is ten dollars or more per ton, shall be accompanied by a plainly printed and legible statement, clearly and truly certifying the number of net pounds of fertilizer in a package, the name, brand or trade-mark under which the fertilizer is sold, the name and address of the manufacturer or importer, and a chemical analysis stating the minimum percentages of nitrogen, of potash soluble in distilled water, and of soluble, reverted, insoluble, available and total phosphoric acids, and the maximum percentage of chlorin, or such of these as are claimed to be present; the several constituents to be determined by the methods adopted at the time by the association of official agricultural chemists.

Sec. 4. The manufacturer, importer, agent or seller of a commercial fertilizer, the retail price of which is ten dollars or more per ton, shall, before the same is sold, offered or exposed for sale, annually in the month of December, pay the director of the Vermont agricultural experiment station a license fee of one hundred dollars. Said director, on the receipt of such fee, shall issue to such licensee a license permitting the sale in the state of not to exceed five brands of commercial fertilizer, all of which brands shall be the product of the licensee. If any manufacturer, importer, agent or seller desires to sell, offer or expose for sale more than this number of brands, he shall annually in the month of December pay a license fee of twenty dollars for each and every brand or kind of commercial fertilizer, bearing a distinctive name, brand or trade mark, which said manufacturer, importer, agent or seller is to sell, offer or expose for sale in excess of five; provided that if said fertilizer is claimed to or does contain phosphoric acid and either nitrogen or potash only, the license fee shall be fifteen dollars. Said director, on the receipt of each such fee, shall issue to such licensee a license for the sale of the brand or kind of commercial fertilizer for which the fee is paid.

Sec. 5. Whenever a manufacturer, importer, agent or seller of a commercial fertilizer desires at any time to sell such material and has not paid the license fee therefor in the preceding month of December, as required in section four, he shall pay the license fee prescribed therein before offering or exposing the material for sale. The license fee due in December shall cover and authorize all sales within the state of the brands or kinds of commercial fertilizer specified in the license for the calendar year next succeeding that month. All licenses shall expire on the thirty-first day of December of the year for which they are issued. Whenever the manufacturer, importer or shipper of a commercial fertilizer or material used for manurial purposes shall have paid the license fee, no agent or seller of said manufacturer, importer or shipper shall be required to pay such fee.

Sec. 6. The amount of the license fees received by said director shall be paid by him to the state treasurer. So much of the fees collected under this act shall be paid by the state treasurer to the treasurer of said experiment station as the director of said experiment station may show by his bills has been expended in performing the duties required by this act, but in no case to exceed the amount of the license fees received by the state treasurer under this act, such payment to be made on or before the thirtieth day of June upon the order of the state auditor, who is hereby directed to draw his order for such purpose. The director shall annually publish a statement of the receipts and expenditures under this act.

Sec. 7. No person shall sell, offer, or expose for sale in this state, leather or its products, hair, wool waste, garbage, tankage or other inert nitrogenous material, as a fertilizer, or as an ingredient of any fertilizer, unless an explicit printed statement of the fact shall be conspicuously affixed to every package of such fertilizer, and shall accompany every parcel or lot of the same.

Sec. 8. Any person knowingly selling, offering or exposing for sale, a commercial fertilizer, without the statement required by section three of this act, or containing a smaller percentage of any one or more of the ingredients named therein, other than chlorin, than is specified on the label, or for the sale of which the license fee specified in section four has not been paid or who fails to comply with any of the sections of this act, subject to the exceptions cited in section twelve of this act, shall, on conviction by a court of competent jurisdiction, be fined not more than fifty dollars for the first offense, and not more than one hundred dollars for each subsequent offense.

Sec. 9. The director of the Vermont agricultural experiment station is hereby fully empowered and authorized, in per-

son or by deputy, to enter any premises where commercial fertilizers are stored, and to take a sample not exceeding two pounds in weight for analysis from any lot or package of any commercial fertilizer, or material used for manurial purposes, which may be in the possession of any manufacturer, importer, agent or dealer. Said sample shall be taken from a parcel or number of packages which shall not be less than five percent of the whole lot inspected, and shall be thoroughly mixed and placed in a suitable vessel, carefully sealed, and a label placed thereon stating the name or brand of the fertilizer or material sampled, the name of the party from whose stock the sample was drawn, and the time and place of drawing, and said label shall be signed by the director or his deputy, provided, however, that whenever requested said sample shall be taken in duplicate and carefully sealed in the presence of the party or parties in interest or their representative, in which case one of said duplicate samples shall be retained by the director and one by the party whose stock was sampled. The sample or samples retained by the director shall be for comparison with the certified statement named in section three of this act.

Sec. 10. Said director shall cause at least one sample of each brand or kind of fertilizer collected as herein provided to be analyzed annually and the results, together with such additional information in relation to the character, composition, value and use of said fertilizer as circumstances may advise, shall be published in reports, bulletins, special circulars or elsewhere, as promptly as the progress of the analyses will allow and as frequently as time and means permit.

Sec. 11. Any person who shall hinder, impede or obstruct the director or his deputy, while in the discharge of his duty under this act, shall be deemed guilty of a misdemeanor, and, upon conviction thereof, shall be fined not less than twenty-five dollars nor more than one hundred dollars for each offense.

Sec. 12. The director of the Vermont agricultural experiment station upon ascertaining any violation of this act for the first time shall forthwith notify the manufacturers or importers in writing and give them not less than thirty days thereafter in which to comply with the requirements of this act. In case of second or subsequent violation by the same party or parties, or in case, after a lapse of thirty days, the requirements of this act remain still uncomplished with, it shall be the duty of said director to notify the state's attorney of the county in which the violation of this act is claimed to have occurred to the end that the violator may be prosecuted; but there shall be no prosecution in relation to the quality of the fertilizer or fertilizing material, if the same

shall be found to be substantially equivalent to the statement of analysis made by the manufacturers or importers.

Sec. 13. For all the purposes of this act, fertilizers shall be considered as distinct brands when differing either in guaranteed composition, trade mark, name, or in any other characteristic method of marking of whatever nature.

Sec. 14. This act shall not affect parties manufacturing, importing, or purchasing fertilizers for their own use and not to sell in this state.

Sec. 15. Sections 4346 to 4359 inclusive of the Vermont Statutes and all acts or parts of acts inconsistent herewith are hereby repealed.

Sec. 16. This act shall take effect from its passage.

Approved December 11, 1902.

NO. 81.

AN ACT FOR THE PROTECTION OF DAIRYMEN, RELATING TO TESTING MILK AND CREAM.

It is hereby enacted by the General Assembly of the State of Vermont:

Section 1. All bottles, pipettes or other measuring glasses used by any person, firm or corporation, or their agents or employees, at any creamery, butter factory, cheese factory, or condensed milk factory or elsewhere in this State, in determining by Babcock test, or by any other test, the value of milk or cream received from different persons or parties at such creameries or factories, shall, before such use, be tested for accuracy of measurement and for accuracy of the per cent. scale marked thereon. It shall be the duty of the superintendent of the dairy school of the University of Vermont and State Agricultural College to designate some competent person to test the accuracy of such bottles, pipettes, or other measuring glasses. The person thus designated shall so mark such bottles, pipettes, or other measuring glasses as are found correct in marks or characters which cannot be erased, which marks or characters shall stand as proof that they have been so tested; and no incorrect bottles, pipettes or other glasses shall be thus marked. The superintendent of the dairy school shall receive for such service the actual cost incurred and no more, the same to be paid by the persons or corporations for whom it is done.

Sec. 2. Each and every person, who, either for himself or in the employ of any other person, firm or corporation, manipu-

lates the Babcock test, or any other test, whether mechanical or chemical, for the purpose of measuring the contents of butter fat in milk or cream as a basis for apportioning the value of such milk or cream, or the butter or cheese made from the same shall secure a certificate from the superintendent of the dairy school of the University of Vermont and State Agricultural College that he or she is competent and well qualified to perform such work. The rules and regulations in the application for such certificate and in the granting of the same shall be such as the superintendent of the school may arrange. The fee for issuing such certificates shall in no case exceed one dollar, the same to be paid by the applicant to the superintendent of the Dairy School and to be used by the superintendent in meeting the expenses incurred under this section.

Sec. 3. Any person or persons violating any of the provisions of this act shall, on conviction in court of competent jurisdiction, be fined not more than twenty-five dollars for the first offense, and not more than fifty dollars for each subsequent offense. It shall be the duty of every sheriff, deputy sheriff and constable to institute complaint against any person or persons violating any of the provisions of this act, and on conviction one half of the fine shall go to the complainant and the balance to the State.

Approved November 19, 1898.

NO. 82.

AN ACT IN RELATION TO CREAMERIES AND CHEESE FACTORIES AND THE MANAGEMENT OF THE SAME.

Section	Section
1. Owners of creameries to deliver to patrons monthly detailed statement.	4-5. Owners of creameries to make monthly statement of total receipts of milk and pounds of butter produced.
2. Creameries must weigh, sample and test milk.	6. Penalty for neglecting to comply with act.
3. Owners of cheese factories to deliver to patrons detailed monthly statement.	7. Act takes effect January 1, 1899.

It is hereby enacted by the General Assembly of the State of Vermont:

Section 1. Every owner, operator or manager of a creamery in this State whether co-operative or proprietary, shall monthly make and deliver to each of the patrons of said creamery a statement of the number of pounds of milk or cream such

patron delivers for that month, together with the test, pounds of butter fat, gain per cent. from the churn, and actual pounds of butter produced from said milk, and the price paid for the same shall be computed on the actual pounds of butter.

Sec. 2. Any owner, operator or manager of any creamery, whether co-operative or proprietary, who sells or otherwise disposes of any of the milk received at such creamery shall weigh and carefully sample the same and shall test such samples for the purpose of ascertaining the number of pounds of butter fat in such milk sold, or otherwise disposed of, and the gain per cent. which is found to be the gain from the churn for that month shall be the one used in ascertaining the actual number of pounds of butter produced from such milk as is sold or otherwise disposed of.

Sec. 3. The owner, operator or manager of any cheese factory in the State, whether co-operative or proprietary, shall make and deliver to each of the patrons of said factory a statement representing the number of pounds of milk he delivers for each month, together with the test and actual number of pounds of cheese produced by such milk for said month. And the price paid for the same shall be computed on actual number of pounds of cheese.

Sec. 4. Every owner, operator or manager of a creamery in this State, whether co-operative or proprietary, shall make a statement each month of the total number of pounds of milk received for that month, together with the gain per cent. from the churn, and the actual number of pounds of butter produced from said milk and cream.

Sec. 5. The statement mentioned in the preceding section shall be posted in a conspicuous place in said creameries.

Sec. 6. Any manager or proprietor of any creamery in the State, who fails to comply with any of the provisions of this act, shall, on conviction in a court of competent jurisdiction be fined not less than fifty dollars nor more than two hundred dollars for each offense.

Sec. 7. This act shall take effect January 1, 1899.

Approved November 29, 1898.

NO. 82.

AN ACT TO PROTECT MILK DEALERS AND CONSUMERS AGAINST THE UNLAWFUL USE AND DESTRUCTION OF MILK CANS AND OTHER RECEPTACLES.

Section

1. Persons having names on cans may file in town clerk's office description of name; publication in newspaper.
2. Person using such can so marked fined for each case so used.

Section

3. Person mutilating such can fined or imprisoned.
4. Person putting foul matter into can punished.
5. Person concealing can brought before a justice for hearing; search warrant.

It is hereby enacted by the General Assembly of the State of Vermont:

Section 1. All persons and corporations engaged in buying, selling or dealing in milk or cream in cans, jugs, bottles or jars, with their names or other marks or devices, branded, engraved, blown, or otherwise produced in a permanent manner in or upon such cans, jugs, bottles or jars, may file in the office of the clerk of the city or town in which their principal place of business is situated, a description of the name or names, mark or marks, device or devices so used by them, and cause such description to be published once each week for four weeks successively in a newspaper published in the city or town in which said description has been filed as aforesaid except that where there is no newspaper published in such city or town then such publication may be made in any newspaper published in the county in which such city or town is situated.

Sec. 2. Whoever without the consent of the owner takes and detains or uses in his business, sells, disposes of, buys, conceals or traffics in any milk or cream can, jug, bottle, or jar, the owner of which has complied with the provisions relating thereto in section one of this act, shall be punished for the first offense by a fine not exceeding five dollars, or by punishment in the house of correction for a term not exceeding sixty days, for each can, jug, bottle or jar so taken, and detained or used in his business, sold, disposed of, bought, concealed or trafficked in, and for any subsequent offense by a fine not exceeding ten dollars, or by imprisonment in the house of correction for a term not exceeding six months, for each can, jug, bottle or jar so taken and detained or used in his business, sold, disposed of, bought, concealed or trafficked in as aforesaid. Possession by any person in the transaction of his business of any such article the owner of which has complied with the provisions of section one of this act shall constitute *prima facie* evidence of the un-

lawful taking, use, detention, possession of or traffic in the same within the meaning of this act.

Sec. 3. Whoever without the consent of any owner who has complied with the provisions of section one of this act wilfully destroys, mutilates, or defaces any can, jug, bottle or jar bearing such owner's name, mark or device, or wilfully erases, mars, covers, or changes any word or mark branded, engraved, blown or otherwise produced, in a permanent manner in or upon any such can, jug, bottle or jar, shall be punished for the first offense by a fine not exceeding five dollars, or by imprisonment in the house of correction for a term not exceeding sixty days, for each can, jug, bottle or jar so destroyed, mutilated or defaced, or for each can, jug, bottle or jar upon which any word or mark has been erased, marred, covered or changed as aforesaid; and for any subsequent offense by a fine not exceeding ten dollars, or by imprisonment in the house of correction for a term not exceeding six months, for each can, jug, bottle or jar so destroyed, mutilated or defaced, or for each can, jug, bottle or jar upon which any word or mark has been erased, marred, covered or changed as aforesaid.

Sec. 4. Whoever puts any unclean or foul substance or matter into any milk or cream can, jug, bottle or jar, the owner of which has complied with the provisions of section one of this act, shall be punished for the first offense by a fine of not less than fifty cents nor more than five dollars, for each can, jug, bottle or jar so defiled; and for any subsequent offense by a fine of not less than two dollars nor more than twenty dollars, for each can, jug, bottle or jar so defiled.

Sec. 5. Whenever any person or corporation having complied with the provisions of section one of this act, or mutilates, destroys or pollutes any butter crates or carriers, or the agent of any such person or corporation, shall make oath before any justice of the peace or municipal court, that he has reason to believe and does believe that any person or corporation has wrongfully in possession or is secreting any of his or its milk cans, jugs, bottles or jars, marked and described as provided in section one of this act, said justice of the peace or municipal court shall, if satisfied that there is reasonable cause for such belief, issue a search warrant to discover and obtain the same, and may also cause to be brought before him the person or an agent or employee of the corporation in whose possession such cans, jugs, bottles or jars are found, and shall thereupon inquire into the circumstances of such possession; and if said justice of the peace or municipal court finds that such person or corporation has been guilty of a wilful violation of sections two, three or four of this act he shall impose the penalty prescribed in the

section or sections so violated, and shall also award to the owner possession of the property taken upon such search warrant.

Approved November 11, 1902.

NO. 84.

AN ACT TO REGULATE THE SALE OF CONCENTRATED COMMERCIAL FEEDING STUFFS.

Section

1. Every lot of concentrated feeding stuff shall have printed statement affixed thereto; contents of statement.
2. Concentrated commercial feeding stuff defined.
3. Term does not include certain articles.
4. Analysis of feeding stuffs; payment for by state.
5. Payment by state treasurer to director.
6. Penalty for selling without statement.
7. Director of experiment station may enter premises where feeding stuff is sold to take sample.

Section

8. Penalty for obstructing director in discharge of his duties.
9. Analysis of sample.
10. Adulteration of grain; penalty for.
11. Manufacturer notified if feeding stuff is found adulterated; prosecution of seller.
12. Prosecution of parties in case of second offense.
13. Distinct brands.
14. Not to affect stock on hand.
15. Importer defined.
16. No. 83 Acts of 1898 repealed.
17. Takes effect December 1, 1902.

It is hereby enacted by the General Assembly of the State of Vermont:

Section 1. Every lot or parcel of any concentrated feeding stuff, as defined in section two of this act, used for feeding farm live stock, sold, offered or exposed for sale in this state, shall have affixed thereunto, in a conspicuous place on the outside thereof, a legible and plainly printed statement clearly and truly certifying the number and net pounds of feeding stuff in a package, the name, brand or trade mark under which the article is sold, the name and address of the manufacturer or importer, and a chemical analysis stating the minimum percentages it contains of crude protein, allowing one per cent. of nitrogen to equal six and one-fourth per cent. of protein, and of crude fat, and the maximum percentage it contains of crude fibre, the several constituents to be determined by the methods adopted at the time by the association of official agricultural chemists; provided that the statement of the percentage of crude fat may be omitted if it does not exceed three per cent., and that of the crude fibre if it does not exceed ten per cent. If the feeding stuff is sold at retail in bulk or put up in packages belonging to the purchaser, the agent or dealer shall, upon request of the purchaser, furnish him with the certified statement named in this section.

Sec. 2. The term concentrated commercial feeding-stuff, as here used, shall include linseed meals, cottonseed meals, cottonseed feeds, pea meals, cocoanut meals, gluten meals, gluten feeds, maize feeds, starch feeds, sugar feeds, dried distiller's grains, dried brewer's grains, malt sprouts, hominy feeds, cerealine feeds, rice meals, oat feeds, corn and oat chops, corn and oat feeds, corn bran, ground beef or fish, scraps, meat and bone meals, mixed feeds other than those composed solely of wheat bran and middlings mixed together or with pure grains, provenders other than those composed of pure grains ground together, condimental stock and poultry foods, patented proprietary or trade-marked stock and poultry foods, and all other materials of a similar nature not included in section three of this act.

Sec. 3. The term concentrated commercial feeding-stuff, as here used, shall not include hays and straws, the whole seed nor the unmixed meals made directly from the entire grains of wheat, rye, barley, oats, Indian corn, buckwheat, India wheat and broom corn. Neither shall it include wheat, rye and buckwheat brans or middlings not mixed with other substances, but sold separately as distinct articles of commerce, nor wheat bran and middlings mixed together and not mixed with any other substances, nor pure grains ground together and not mixed with any other substances, nor pure grains ground together, when unmixed with substances other than wheat, rye or buckwheat brans or middlings.

Sec. 4. The auditor of accounts is hereby directed to draw an order on the state treasurer for the sum of five hundred dollars annually in favor of the treasurer of the University of Vermont State Agricultural College, the same or such portion thereof as is found necessary, to be expended by the experiment station in the analysis of concentrated commercial feeding-stuffs.

Sec. 5. So much of the appropriation granted under this act shall be paid by the state treasurer to the treasurer of said experiment station as the director of said experiment station may show by his bills has been expended in performing the duties required by this act, but in no case to exceed the amount of the appropriation received from the state treasurer under this act, such payment to be made quarterly upon the order of the state auditor, who is hereby directed to draw his order for such purpose. The director shall annually publish a statement of the receipts and expenditures under this act.

Sec. 6. Any manufacturer, importer, agent or person knowingly selling, offering or exposing for sale any concentrated commercial feeding-stuff, as defined in section two of this act, without the statement required by section one of this act, or

stating that said feeding-stuff contains substantially a larger percentage of crude protein or crude fat, or substantially a smaller percentage of crude fiber, than is contained therein, shall, on conviction in a court of competent jurisdiction, be fined not more than fifty dollars for the first offense, and not more than one hundred dollars for each subsequent offense.

Sec. 7. The director of the Vermont agricultural experiment station is hereby fully empowered and authorized in person or by deputy to enter any premises where feeding-stuffs are stored and to take a sample not exceeding two pounds in weight for analysis from any lot or package of any commercial feeding-stuff, including the excepted materials named in section three, which may be in the possession of any manufacturer, importer, agent or dealer in this State. Said sample shall be taken from a parcel or number of packages which shall be not less than five per cent. of the whole lot inspected, and shall be thoroughly mixed and placed in a suitable vessel, carefully sealed and a label placed thereon, stating the name or brand of the feeding-stuff or material sampled, the name of the party from whose stock the sample was drawn, and the time and place of drawing. And said label shall be signed by the director or his deputy; provided, however, that whenever requested said sample shall be taken in duplicate and carefully sealed in the presence of the party or parties in interest or their representative, in which case one of said duplicate samples shall be retained by the director and the other by the party whose stock was sampled. The sample or samples retained by the director shall be for comparison with the certified statement named in section one of this act.

Sec. 8. Any person who shall hinder, impede, or obstruct the director or his deputy, while in discharge of his duty under this act shall be deemed guilty of a misdemeanor, and upon conviction thereof, shall be fined not less than twenty-five dollars nor more than one hundred dollars for each offense.

Sec. 9. Said director shall cause at least one sample of each brand or kind of feeding-stuff, collected as herein provided, to be analyzed annually. Said analysis may include determination of crude protein, crude fat, and such other ingredients as it is deemed advisable at any time to determine. The results of the analysis of the sample or samples collected as herein provided, together with such additional information in relation to the character, composition and use thereof as circumstances may advise, shall be published in reports, bulletins, special circulars, or elsewhere annually or more frequently as is deemed advisable.

Sec. 10. Any person who shall adulterate any whole or ground grain with milling or manufactured offals, or with any foreign substance whatever, or any bran or middlings made from the several grains or the mixtures of wheat bran, and middlings known in trade as mixed feed with any foreign substance whatever, for the purpose of sale, unless the true composition, mixture or adulteration thereof is plainly marked or indicated upon the packages containing the same, or in which it is offered for sale; or any person who knowingly sells or offers for sale any whole or ground grain, bran or middlings which have been so adulterated unless the true composition, mixture or adulteration thereof is plainly marked or indicated upon the package containing the same, or in which it is offered for sale, shall, on conviction in a court of competent jurisdiction, be fined not less than twenty-five or more than one hundred dollars for each offense.

Sec. 11. If any feeding-stuff, not guaranteed as provided in section one of this act, is proved on analysis to be adulterated, the director shall give to the manufacturer, importer, agent or seller, the thirty days' notice hereinafter provided for in section twelve of this act, and upon their failure to comply with the law within that time, shall notify the state's attorney for the county in which said feeding-stuff was offered for sale, to the end that the violator may be prosecuted.

Sec. 12. The director of the Vermont agricultural experiment station, upon ascertaining any violation of this act for the first time, shall forthwith notify the manufacturers or importers in writing and give them not less than thirty days thereafter in which to comply with the requirements of this act. In cases of second or subsequent violation by the same party or parties, or in case, after a lapse of thirty days, and the requirements of this act remain still uncomplied with, it shall be the duty of said director to notify the state's attorney of the county in which the violation of this act is claimed to have occurred, to the end that the violator may be prosecuted; but there shall be no prosecution in relation to the quality of any commercial feeding-stuff if the same shall be found to be substantially equivalent to the statement of analysis made by the manufacturers or importers.

Sec. 13. For all the purposes of this act commercial feeding-stuffs shall be considered as distinct brands when differing either in guaranteed composition, trade mark, name, or in any other characteristic method of marking of whatever nature.

Sec. 14. This act shall not affect stock on hand held by dealers December first, 1902, nor parties manufacturing, importing or purchasing feeding-stuffs for their own use and not to sell in this state.

Sec. 15. The term "importer," for all the purposes of this act, shall be taken to mean all who procure or sell concentrated commercial feeding-stuffs made in other states.

Sec. 16. Number eighty-three of the acts of 1898, and all acts or parts of acts inconsistent herewith are hereby repealed.

Sec. 17. This act shall take effect December 1, 1902.

Approved December 10, 1902.

REPORT OF THE SECRETARY.

C. J. BELL, Governor.

Sir:—

I have the honor herewith to submit this, my first annual report of the Board of Agriculture, for the year ending June 30, 1905.

The Board held forty meetings during the winter months, most of them one day meetings of two and sometimes three sessions.

Every phase of agriculture was discussed at these meetings, including good roads and forestry. The board was ably assisted by Prof. B. E. Fernald, of Ithaca, N. Y.; Prof. P. W. Ayers, of New Hampshire; Prof. S. C. Thompson, Maine Dairy Instructor; Prof. C. S. Phelps, of Connecticut, Superintendent of Grassland Farms; Dr. J. L. Hills, Vermont Experiment Station; Prof. L. R. Jones, Vermont Experiment Station; F. L. Davis, Secretary of Vermont Dairymen's Association; George H. Terrill, of Morrisville; Arthur M. Vaughan, Randolph; Hon. Homer W. Vail, Randolph; Hon. Victor I. Spear, Secretary Cattle Commission; L. G. Stockwell, Stereoptician; Dr. H. D. Holton, Secretary State Board of Health; Hon. Mason S. Stone, State Superintendent of Education; The State Tuberculosis Commission, consisting of Dr. Don. D. Grout, of Waterbury; Dr. Edward R. Campbell, Bellows Falls; Dr. W. N. Bryant, Ludlow; Dr. S. E. Darling, Hardwick; Henry Ballard, Burlington.

One member of this commission was present at nearly every meeting and discussed their special subject both interestingly and instructively.

Several of the meetings were honored by the presence of His Excellency, the Governor, whose sound advice was fully appreciated.

This has been a prosperous year for all branches of farming, crops have been good and prices such as to leave a fair margin of profit under good management.

The increase in the price of wool has given a stimulus to the sheep industry and if the improvement keeps on we will once more see our hill pastures covered with "they of the Golden Hoof," and this change will help to solve the labor question which is getting to be a serious one with our farmers.

The illustrated pamphlet, entitled "Vermont 1905," is in such great demand that the issue will soon be exhausted.

The call for it comes from all of the states and large cities in the country and from many foreign countries, including India, Africa and Japan.

The numerous inquiries in regard to the best location and opportunity for summer homes coming from the large cities both east and west, show that the people of means are just waking up to the fact that "Vermont" offers unexcelled advantages for health and recreation during the summer months.

List of Associations and Fairs in Vermont for 1905.

ASSOCIATIONS IN VERMONT.

STATE AGRICULTURAL SOCIETY.

George Aitken, Woodstock, President.

C. M. Winslow, Brandon, Secretary.

J. W. Parker, Quechee, Treasurer.

No fair to be held this year.

VERMONT DAIRYMEN'S ASSOCIATION.

H. C. Bruce, Sharon, President.

F. L. Davis, North Pomfret, Secretary.

M. A. Adams, Derby, Treasurer.

Date of meeting not arranged.

VT. MAPLE SUGAR MAKERS' ASSOCIATION.

Perry Chase, East Fairfield, President.

A. J. Croft, Enosburgh Falls, Secretary.

Homer W. Vail, Randolph, Treasurer.

Date of meeting not arranged.

VERMONT JERSEY CATTLE CLUB.

Homer W. Vail, Randolph, President.

T. G. Bronson, East Hardwick, Secretary.

N. S. Boyden, Randolph, Treasurer.

VT. MERINO SHEEP BREEDERS' ASSOCIATION.

E. N. Bissell, East Shoreham, President.

C. A. Chapman, Ferrisburgh, Secretary and Treasurer.

Annual meeting of 1906, third Wednesday of January.

VERMONT STATE POULTRY ASSOCIATION.

H. W. Ballard, St. Albans, President.

H. M. Barrett, St. Albans, Secretary and Treasurer.

Date of show not arranged.

VERMONT STATE HORTICULTURAL SOCIETY.

E. S. Brigham, St. Albans, President.

W. Stuart, Burlington, Secretary.

A. M. Vaughan, Randolph, Treasurer.

Date of meeting not arranged.

VERMONT SHROPSHIRE SHEEP ASSOCIATION.

George H. Merrill, Morrisville, President.

A. A. Niles, Morrisville, Secretary and Treasurer.

GREEN MOUNTAIN COTSWOLD SHEEP ASSOCIATION.

Frank Phillips, Glover, President.

A. A. Niles, Morrisville, Secretary and Treasurer.

Meeting in June, 1905.

MORGAN HORSE BREEDERS' ASSOCIATION.

Ex.-Gov. J. W. Stewart, Middlebury, President.

H. T. Cutts, Orwell, Secretary.

C. E. Pinney, Middlebury, Treasurer.

VERMONT FAIRS FOR 1905.

ADDISON COUNTY.

Addison County Agricultural Society.

F. C. Dyer, West Salisbury, President.

Fred L. Hamilton, West Salisbury, Secretary.

C. E. Pinney, Middlebury, Treasurer.

Hold fair Sept. 5-6-7-8, 1905.

BENNINGTON COUNTY.

Battenkill Valley Industrial Society.

E. B. Smith, Manchester Center, President.

J. F. Page, Manchester Center, Secretary.

D. H. Dyer, Manchester Center, Treasurer.

CALEDONIA COUNTY.*Caledonia County Fair Ground Association.*

E. M. Taft, St. Johnsbury, President.

H. A. Stanley, St. Johnsbury, Secretary and Treasurer.

Hold fair in St. Johnsbury Sept. 19-20-21, 1905.

Caledonia Grange Fair.

George Lovejoy, East Hardwick, President.

E. B. Fay, East Hardwick, Secretary and Treasurer.

Hold fair in East Hardwick Sept. 23d, 1905.

FRANKLIN COUNTY.

Franklin County Agricultural and Mechanical Society.

C. W. Gates, Franklin, President.

C. A. Glover, St. Albans, Secretary.

S. P. Twigg, St. Albans, Treasurer.

Hold fair at St. Albans, Sept. 5-6-7, 1905.

LAMOILLE COUNTY.

Lamoille Valley Fair Ground Company.

G. M. Powers, Morrisville, President.

O. M. Waterman, Morrisville, Secretary and Treasurer.

Hold fair at Morrisville, Aug. 29-30-31, 1905.

ORANGE COUNTY.

Bradford Agricultural and Trotting Association.

T. J. Albee, Bradford, President.

M. A. Jenkins, Bradford, Secretary.

E. W. Cunningham, Bradford, Treasurer.

Hold fair at Bradford, Aug. 29-30-31, 1905.

UNION AGRICULTURAL SOCIETY.

N. H. Austin, Tunbridge, President.

W. W. Swan, North Tunbridge, Secretary.

H. R. Hayward, Tunbridge, Treasurer.

Date of fair not arranged.

RUTLAND COUNTY.

Rutland County Agricultural Society.

D. W. Temple, Rutland, President.

Walter A. Clark, Rutland, Secretary.

W. R. Kinsman, Rutland, Treasurer.

Hold fair in Rutland, Sept. 12-13-14, 1905.

WASHINGTON COUNTY.

Winooski Valley Agricultural Association.

G. E. Moody, Waterbury, President.

Charles Keene, Waterbury, Secretary.

William B. Ellis, Waterbury, Treasurer.

Hold fair at Waterbury, Sept. 12-13-14, 1905.

Dog River Valley Fair Association.

Geo. S. Colby, Williamstown, President.

F. G. Fisher, Northfield, Secretary.

A. E. Denney, Northfield, Treasurer.

Hold fair at Northfield Sept. 19-20-21, 1905.

WINDHAM COUNTY.

Valley Fair Association.

G. W. Pierce, Brattleboro, President.

D. E. Tasker, Brattleboro, Secretary.

F. C. Adams, Brattleboro, Treasurer.

Hold fair at Brattleboro, Sept. 27-28, 1905.

WINDSOR COUNTY.

Windsor County Agricultural Society.

A. E. Fuller, Pomfret (P. O. Woodstock), President.

C. J. Paul, Woodstock, Secretary.

C. H. English, Woodstock, Treasurer.

Hold fair at Woodstock, Sept. 26-27-28, 1905.

Springfield Agricultural Society.

A. J. Crosby, Springfield, President.

Fred C. Davis, Springfield, Secretary.

Geo. F. Leland, Springfield, Treasurer.

Hold fair at Springfield, Sept. 12-13, 1905.

VERMONT STATE GRANGE.

OFFICERS.

MASTER—C. J. BELL, East Hardwick.	TREASURER—F. B. PIER, Rawsonville.
OVERSEER—C. F. SMITH, Morrisville.	SECRETARY—A. A. PRIEST, Randolph.
LECTURER—R. B. GALUSHA, Royakton.	GATE KEEPER—A. F. LAWRENCE, St. Johnsbury.
STEWARD—D. H. MORSE, Randolph.	CERES—Mrs. C. J. BELL, East Hardwick.
ASSISTANT STEWARD—M. B. ROBERTS, Rupert.	POMONA—Mrs. C. F. SMITH, Morrisville.
CHAPLAIN—R. H. HOLMES, Shoreham.	FLORA—Mrs. H. W. SARGENT, Brattleboro.
	LADY ASSISTANT STEWARD—Mrs. M. B. ROBERTS, Rupert.

EXECUTIVE COMMITTEE.

H. W. SARGENT, Brattleboro, term expires, 1906.	C. A. BUMP, Salisbury, term expires, 1906
D. H. MORSE, Randolph, term expires, 1905.	L. N. CRAGIN, Springfield, term expires, 1905.
MASTER AND SECRETARY, EX-OFFICIO.	

DEPUTIES AND THEIR JURISDICTIONS.

GENERAL DEPUTY, D. H. MORSE, Randolph.

C. S. Albee, Bellows Falls.	JURISDICTION.	C. A. Bump, West Salisbury.	JURISDICTION.
Boyden, Maple Grove, Pleasant Valley,	Saxtons River, Fall Mountain.	Middlebury, Shoreham, Neshobe, Beaver Glen, Cornwall,	Grand View, Dunmore, Bridport, Prospect.
E. H. Hallett, St. Johnsbury Center.	JURISDICTION.	E. F. Whitcomb, Chester Depot.	JURISDICTION.
McIndoe, Green Mountain. Independent, Sutton, Passumpsic,	Enterprise, Wide Awake, Blue Mountain, Hilltop, Riverside.	Springfield, Industrial, Grafton,	Chester, Gassetts.
S. M. Hood, West Topsham.	JURISDICTION.	H. W. Sargent, Brattleboro.	JURISDICTION.
Silver Leaf, Clover Leaf, Waits River Valley,	Eclipse, Pulaski, Golden Rod.	Protective, Evening Star, Newfane,	Broad Brook, Vernon, Putney.
R. B. Galusha, Royalton.	JURISDICTION.	E. S. Cook, West Halifax.	JURISDICTION.
White River, Good Will,	Rising Star.	Guiding Star, North River,	Victory.

F. B. Pier, Rawsonville.	JURISDICTION.	Frank Martin, Williamstown.	JURISDICTION.
Farmers, Vermont, West Branch,		Williamstown,	Washington,
W. C. Mason, Rupert.	JURISDICTION.	W. L. Dow, Hardwick.	JURISDICTION.
Mt. Anthony, Dorset,		Caledonia, Hardwick,	Craftsbury, Danville,
Cassius Peck, Burlington.	JURISDICTION.	H. N. Davis, Brownington.	JURISDICTION.
Essex Center, Woodlawn, Mount Mansfield,		Missisquoi Valley, Eureka, Brownington,	Willoughby, Glover,
G. H. Terrill, Morrisville.	JURISDICTION.	Mrs. L. H. Morgan, South Woodstock.	JURISDICTION.
Lamolle, Mansfield Mountain,		Ottawaquechee, Orton, Gleaner, Valley,	Progressive, Ascutney, Quechee, Teago,
G. C. Flint, Randolph.	JURISDICTION.	E. W. Johnson, Ludlow.	JURISDICTION.
Snowsville, Northfield,		Cavendish, Ludlow,	Bridge-water,
H. M. Farnham,	JURISDICTION.	L. N. Benedict, Castleton.	JURISDICTION.
East Montpelier, Dog River Valley, Calais,		Romoseen, Center, Pittsford, Maple Valley,	Otter Creek, Poultney, Rutland Valley,

NUMBER, NAME AND LOCATION	OFFICERS AND OFFICE	ADDRESS
1 Chittenden County	{ L. R. Gleason, Master Mrs. Laura Allen, Lecturer Albert Walston, Secretary	Jericho Milton
2 Shepherd	{ E. A. Gray, Master Mrs. Ida Brewer, Lecturer Mrs. Carrie Beck, Secretary	St. Johnsbury Ctr. St. Johnsbury Ctr. St. Johnsbury Ctr.
3 White River Valley	{ R. B. Galusha, Master J. A. Chedel, Lecturer Mrs. F. A. Waldo, Secretary	Royalton Gaysville Bethel
4 Allen District	{ E. Garfield, Master Mrs. C. S. Albee, Lecturer C. A. Greeley, Secretary	Gassetts Gassetts
5 Windham County	{ R. L. Frost, Master Mrs. W. F. Mixer, Lecturer Abbie A. Bennett, Secretary	Brattleboro Brattleboro East Dummerston
7 Central Vermont	{ W. E. Granger, Master G. C. Flint, Lecturer Albina Wakefield, Secretary	Williamstown Randolph East Braintree
8 Washington	{ No report	
9 Harmony	{ George Chapin, Master Dr. E. J. Foster, Lecturer Fred M. Small, Secretary	Stowe Waterbury Center Morrisville
10 Orange County	{ F. M. Bond, Master Mrs. W. G. Coburn, Lecturer A. W. Banks, Secretary	Thetford Bradford Bradford
11 Connecticut Valley	{ L. M. Morgan, Master Mary Morgan, Lecturer E. D. Sawin, Secretary	South Woodstock South Woodstock Windsor
12 Saxtons River Valley	{ George A. Halladay, Master Mrs. J. H. Clark, Lecturer J. H. Clark, Secretary	Bellows Falls Westminster West Westminster West
13 C. J. Bell	{ C. F. Bump, Master Mrs. S. C. Lane, Lecturer W. F. Bump, Secretary	West Salisbury West Salisbury West Salisbury

POMONA GRANGES.

SUBORDINATE GRANCES.

NUMBER, NAME, LOCATION, WHEN AND BY WHOM ORGANIZED		No. of Members	OFFICERS AND OFFICE		P. O. ADDRESS	REGULAR MEETINGS
1	Green Mountain, St. Johnsbury Ctr. Lawrence, 1871	59	{ Joseph E. Ranney, Master Mrs. Mattie Willey, Lecturer Stella E. Allen, Secretary			1st and 3d Saturday evenings
9	Caledonia, East Hardwick Thompson, 1872	93	{ George W. Lovejoy, Master Mrs. A. Cummings, Lecturer Mrs. Lena Fay, Secretary		Hardwick Hardwick	1st and 3d Thursdays evenings
16	Enterprise, Lyndon 1870	59	{ W. L. Park, Master Mrs. Helen Pope, Lecturer Mrs. Emma Trefren, Secretary		Lyndonville	Saturday after full moon and two weeks thereafter
22	Protective, Brattleboro Thompson, 1873	424	{ H. W. Sargent, Master Mrs. May Edwards, Lecturer Mrs. M. A. Fisher, Secretary			Every other Wednesday commencing Jan. 11
23	Independent, Sheffield Lawrence, 1873	91	{ H. E. Paige, Master Mrs. L. Barber, Lecturer Mrs. H. E. Paige, Secretary			1st and 3d Saturdays
53	White River, Routh Royalton Boyden, 1874	35	{ A. J. Eaton, Master F. E. Haynes, Lecturer Mrs. J. F. Shepard, Secretary			1st Saturday in month and 2d Friday after
66	Wide Awake, St. Johnsbury Ctr. Gile, 1874	64	{ Fred A. Hill, Master Mrs. H. J. Beck, Lecturer Irene S. Hallett, Secretary			2d and 4th Saturdays
80	Middlesex, Middlesex Boyden, 1874	36	{ Ralph O. Wiggins, Master Mabel Long, Lecturer Fred A. Hills, Secretary		Montpelier Montpelier Montpelier	2d and 4th Saturdays
81	Williamstown, Williamstown Boyden, 1874	143	{ C. W. Cram, Master Mrs. Cella Colby, Lecturer Mrs. Martha Erskine, Sec'y			1st and 3d Wednesdays
83	Orion, South Woodstock Boyden, 1874	83	{ R. E. Jaquith, Master Carrie Jaquith, Lecturer E. A. Fullerton, Secretary			2d and 4th Saturdays

193	Snowsville, East Braintree. Boyden, 1874	74	{ C. E. Wakefield, Master Frank Dewey, Lecturer Jennie Perham, Secretary	West Brookfield Brookfield	1st and 3d Saturdays
198	Brookfield, Brookfield Boyden, 1874	92	{ Elliot H. Frink, Master Mrs. Emma B. Holt, Lecturer Mrs. S. C. Follansbee, Sec'y		1st and 3d Fridays
114	Springfield, Springfield Boyden, 1874	218	{ Charles D. Cutler, Master Bertha Whitcomb, Lecturer Miss Alice Cutler, Secretary	Gassetts	2d and 4th Wednesdays
117	Grafton, Grafton Boyden, 1874	33	{ Soln. Cummings, Master Mrs. Sara S. Burlingame, Lect. Mrs. Mabel Williams, Secretary	Houghtonville	Friday on or before full of moon and 2d week after
118	West River, Townshend Boyden, 1874	28	{ G. K. Houghton, Master Mrs. E. B. Bachelier, Lect. Mrs. A. A. Snow, Secretary		Friday on or before full of the moon
127	Industrial, Andover Boyden, 1874	34	{ C. E. Spaulding, Master Mrs. S. A. Rowell, Lecturer W. G. Pinney, Secretary		1st and 3d Saturdays
131	West Branch, Landgrove Boyden, 1874		{ L. F. Woodward, Master Rev. F. A. Woodworth, Lect. Mrs. L. A. Woodward, Sec'y	Weston	1st and 3d Tuesdays
137	Farmers, South Londonderry Boyden, 1874	33	{ O. S. Abbott, Master Rose E. Davis, Lecturer Hattie E. Abbott, Secretary		1st and 3d Fridays
138	Mountain Home, Bondville Boyden, 1874	45	{ B. B. Rawson, Master F. B. Pier, Lecturer H. C. Chatfield, Secretary	Rawsonville Rawsonville	1st and 3d Tuesdays
139	Vermont, Wardsboro Boyden, 1874	23	{ W. H. Hamilton, Master Mrs. W. H. Hamilton, Lect. Mrs. W. W. Kidder, Secretary	East Jamaica East Jamaica	Tuesday on or before the full moon and 2 weeks after
151	Broad Brook, Guilford Center Boyden, 1874	79	{ L. B. Jaquith, Master Miss Nora E. Jaquith, Lecturer Mrs. Mary E. Bullock, Sec'y	Brattleboro Brattleboro	2d and 4th Wednesdays
154	Evening Star, Dummerston Boyden, 1874	76	{ Arthur L. Miller, Master Mrs. Emma F. Hall, Lecturer Abbie A. Bennett, Secretary		
155	Essex Center, Essex Center Narumore, 1874	38	{ Chas. S. Atherton, Master Mrs. Harry W. Ayres, Lect. E. F. Garvin, Secretary	East Dummerston Essex Junction	

156	Maple Grove, Westminster West .. Boyden, 1874	47	{ J. P. Ranney, Master Harian Goodhue, Lecturer Anna C. Clark, Secretary	2d and 4th Thursdays
157	Boyden, Westminster	40	{ O. E. Peck, Master Ray D. Metcalf, Lecturer E. G. Tuthill, Secretary	1st and 3d Fridays
159	Dog River Valley, West Berlin Boyden, 1874	30	{ Norman Colby, Master Mrs. W. E. Colby, Lecturer Addie Hewitt, Secretary	1st and 3d Wednesdays
163	Guiding Star, West Halifax	43	{ Floyd A. Clark, Master Miss Mabel Thurber, Lecturer Ralph Phillips, Secretary	Saturday on or before the full moon
164	Victory, Wilmington		{ Not reported	
165	North River, Jacksonville	56	{ H. H. Barber, Master Mrs. Blanche Gillette, Lect. W. S. Allen, Secretary	2d and 4th Tuesdays
170	Mt. Mansfield, Underhill	42	{ L. H. Pendleton, Master Mrs. Laura Doon, Lecturer R. A. Gleason, Secretary	1st and 3d Wednesdays
228	Vernon, Vernon	56	{ G. K. Stebbins, Master Mrs. A. G. Barnes, Lecturer E. O. Lee, Secretary	1st and 3d Saturdays
229	West Randolph, Randolph	322	{ H. M. Totman, Master Miss Anna Messer, Lecturer John Connolly, Secretary	2d and 4th Saturdays
230	Mt. Anthony, Rupert	96	{ R. F. Hopkins, Master Mrs. H. F. Moore, Lecturer J. F. Sheldon, Secretary	1st and 3d Thursdays
231	Dorset, Dorset	68	{ F. G. Stone, Master Miss Kathryn Brennan, Lect.	1st and 3d Wednesdays
233	Lamoille, Morrisville	153	{ W. S. Daniels, Master Mrs. J. R. Parker, Lecturer E. G. Sherwin, Secretary	2d and last Thursdays, day; evening meetings 3d Thursdays
237	Waterbury, Waterbury Center Flint, 1895	50	{ E. J. Foster, Master Mrs. M. A. Thurston, Lecturer Mrs. F. A. Adams, Secretary	Regular, Tuesday even- ings of each moon

240	Neshobe, Brandon Messer, 1895	118	{ Wm. H. Dean, Jr., Master Mrs. Frank Wood, Lecturer Mrs. Jennie Braley, Secretary		Saturday evenings
242	Pleasant Valley, Rockingham Edson, 1895	100	{ Frank W. Weeden, Master Mrs. H. A. Stoddard, Lect. Miss Mellisa B. Gould, Sec'y	Belkows Falls Chester	2d and 4th Saturdays
247	Rising Star, Bethel Morse, 1897	153	{ Hugh C. Wilson, Master Harry Kent, Lecturer Don A. Wilson, Secretary		2d and 4th Saturdays
249	Woodlawn, West Milton Galusha, 1897	40	{ B. F. Gale, Jr., Master Hattie McNall, Lecturer Laura A. Allen, Secretary	Milton Milton	Every other Wednesday evening from Jan. 11
252	Sutton, Sutton Willey, 1897	27	{ H. A. Blake, Master Anna Mitchell, Lecturer Kate J. Blake, Secretary		2d and 4th Saturdays
254	Silver Leaf, Fairlee Galusha, 1898	70	{ W. C. Ordway, Master Mrs. W. H. Daniel, Lecturer Mrs. M. C. Robinson, Sec'y		2d and 4th Thursdays
255	Eclipse, Thetford Galusha, 1898	80	{ Harley C. Sanborn, Master Mrs. Grace Chase, Lecturer Mrs. Jennie Emerson, Sec'y	East Thetford East Thetford East Thetford	2d and 4th Fridays
257	Missisquoi Valley, Troy Vance, 1898	68	{ A. S. Larabee, Master Leda Chaffee, Lecturer Florence Kendall, Secretary		Alternate Saturday nights
260	Clover Leaf, Bradford Galusha, 1896	80	{ H. E. Kelley, Master Mrs. R. E. Peavey, Lecturer A. M. Banks, Secretary		2d and 4th Wednesdays
261	Pulaski, Newbury Galusha, 1898	21	{ J. A. Johnson, Master		2d and 4th Fridays
263	Blue Mountain, Ryegate Galusha, 1898	66	{ Laura B. Hutchins, Secretary C. F. Smith, Master C. J. N. Shackford, Lecturer F. M. Powers, Secretary		2d and 4th Wednesdays
268	Washington, Washington Galusha, 1898	228	{ Leo W. Seaver, Master Mrs. E. F. Brown, Lecturer Mrs. G. A. Bohonan, Secretary		2d and 4th Fridays
269	Craftsbury, Craftsbury Galusha, 1898	73	{ S. R. Lathie, Master Mrs. H. A. Carrow, Lecturer A. S. Calderwood, Secretary		1st and 3d Fridays

272	Glover, Glover Galusha, 1898	60	{ R. F. Mason, Master Addie Williams, Lecturer Elnora Phillips, Secretary			1st Tuesday evening and 4th Saturday afternoon
273	Bomoseen, Castleton Galusha, 1899	108	{ William E. Estey, Master Mrs. Julia E. Lee, Lecturer Mrs. W. E. Estey, Secretary	Fair Haven		Once in two weeks com- mencing Jan. 13
274	Mansfield Mountain, Stowe Hill, 1899	58	{ W. R. Alger, Master Mrs. W. R. Alger, Lecturer Mrs. J. F. Campbell, Sec'y	Fair Haven		2d and last Saturdays
275	Cavendish, Cavendish Morse, 1900	99	{ Mrs. Gertrude Allen, Master Nellie J. Adams, Lecturer William Butler, Secretary			2d and 4th Tuesdays
276	Ludlow, Ludlow Morse, 1900	164	{ E. W. Johnson, Master John Dorsey, Lecturer Mrs. C. H. Ray, Secretary			2d and 4th Wednesdays
277	Dunmore, Salisbury Bell, 1900		{ C. A. Bump, Master F. J. Sumner, Lecturer W. F. Bump, Secretary	West Salisbury West Salisbury West Salisbury		2d and 4th Tuesdays
278	Ascutney, Windsor Galusha, 1901	59	{ H. N. Thomas, Master Mrs. A. K. Hall, Lecturer Gertrude Kimball, Secretary			1st and 3d Wednesdays
279	Brownington, Brownington Dow, 1900	36	{ W. J. Dutton, Master Mrs. A. W. Willey, Lecturer	Brownington Barton Landing		Every 2 weeks commence- ing Jan. 3
281	Dillingham, Duxbury Hill, 1900	54	{ D. P. Deavitt, Master Mrs. P. Shonko, Lecturer Miss Lena Goodhart, Secretary	Waterbury Waterbury Waterbury		1st and 3d Saturdays
282	Gleaner, Brownsville Galusha, 1900	70	{ F. C. Rick, Master Bertha Dimick, Lecturer E. D. Savin, Secretary	Windsor Windsor Windsor		1st and 3d Tuesdays
283	Progressive, Hartland Galusha, 1900	58	{ J. D. Rogers, Master Mrs. J. B. Miller, Lecturer L. S. Walker, Secretary			Once in 2 weeks from the 1st Monday in January
284	Bridgewater, Bridgewater Morse, 1900	128	{ L. H. Spaulding, Master J. J. Wilder, Lecturer Mrs. Grace Josselyn, Sec'y	Briggs Plymouth		2d and 4th Saturdays
286	Golden Rod, East Corinth Galusha, 1901	106	{ E. S. Rowland, Master Mrs. H. H. Miles, Lecturer George R. Brock, Secretary	Bradford		Every other Friday be- ginning Jan. 6

287	Otter Creek, Clarendon Galusha, 1901	130	{ F. M. Benson, Master Sarah Spencer, Lecturer Gertrude Burr, Secretary	North Clarendon East Clarendon North Clarendon	1st and 3d Thursdays
289	Poultney, Poultney Galusha, 1901	157	{ F. W. Spaulding, Master Mrs. R. R. Thrall, Lecturer Mary Driscoll, Secretary	East Poultney	1st and 3d Wednesdays
290	Center, Hubbardton Galusha, 1901	69	{ C. S. Manchester, Master Mrs. M. Perkins, Lecturer Mrs. Ida Hart, Secretary	Brandon	1st and 3d Fridays
292	Willoughby, Barton Landing Bell, 1901	100	{ E. M. Porter, Master Nellie E. Brennan, Lecturer O. G. Page, Secretary	Brownington Ctr.	Once in 2 weeks beginning Dec. 23, 1904
293	Good Will, Gaysville Morse, 1901	57	{ R. E. Wilson, Master S. C. Harrington, Lecturer Mrs. J. A. Chedel, Secretary		2d and 4th Saturdays
294	Mad River Valley, Waitsfield Small, 1901		{ G. W. Wallis, Master Mrs. Mae Bragg, Lecturer W. C. Kelsey, Secretary		1st and 3d Wednesdays
295	Northfield, Northfield Morse, 1901	170	{ B. A. Denney, Master Charles Kimball, Lecturer F. E. Bacon, Secretary	South Northfield West Benlin	2d and 4th Saturdays
296	Eureka, Coventry Bell, 1902	99	{ John McMurray, Master Mrs. Geo. Trudeau, Lecturer Gerry Edmonds, Secretary		Every other Saturday be- ginning Jan. 14
297	Fall Mountain, Bellows Falls Johnson, 1902	148	{ John S. Knowlton, Master Mrs. Geo. Underwood, Lect. Miss Helena Clarke, Secretary		1st and 3d Tuesdays
298	Saxtons River, Saxtons River Bell, 1902	106	{ John F. Alexander, Jr., Master Mrs. Anna C. Wright, Lect. Harry S. Simonds, Secretary		2d and 4th Fridays
299	Newfane, Newfane Bell, 1903	51	{ W. T. Bruce, Jr., Master Mrs. W. B. Millard, Lecturer Mrs. F. A. DeWitt, Secretary		1st and 3d Wednesdays
301	Hilltop, Lunenburg Bell, 1903	124	{ W. R. Bell, Master Mrs. P. L. Stearns, Lecturer F. C. Currier, Secretary		Every other week begin- ning Jan. 4
302	Shoreham, Shoreham Morse, 1903	57	{ R. H. Holmes, Master Miss Jennie L. Holmes, Lect. S. W. Ward, Secretary		

303	Bridport, 1903 Morse, 1903	Bridport	137	{ Edward Nichols, Master Miss Olive Myrick, Lecturer M. T. Wolcott, Secretary		2d and 4th Tuesdays
304	Cornwall, 1903 Morse, 1903	Middlebury	87	{ T. P. D. Matthews, Master Mrs. C. H. Lane, Lecturer E. H. Matthews, Secretary		1st and 3d Thursdays
305	Riverside, 1903 Hallett, 1903	Wheelock	40	{ C. A. Hoyt, Master Mrs. G. L. Gerry, Lecturer Mrs. A. F. Emertson, Secretary	Lyndon South Wheelock	2d and 4th Saturdays
306	McIndoe, 1903 Hallett, 1903	McIndoe	44	{ C. I. Smith, Master Mrs. R. M. Johnson, Lecturer A. B. Perry, Secretary	McIndoe Falls Monroe, N. H. McIndoe Falls	1st and 3d Tuesdays
308	Ottawaquechee, 1903 Bell, 1903	Taftsville	55	{ E. S. Morrill, Master W. Harold Seaver, Lecturer Mrs. Laura T. Wood, Sec'y		1st and 3d Saturdays
309	Lakeside, 1903 Bell, 1903	St. Albans Bay	64	{ C. G. Newton, Master Carl F. H. Brown, Lecturer Mabel Newton, Secretary	St. Albans St. Albans St. Albans	1st and 3d Mondays
310	Pittsford, 1903 Bell, 1903	Pittsford	65	{ J. O. Candon, Master Isadore Candon, Lecturer Mrs. Geo. Pallmarline, Sec'y		1st and 3d Wednesdays
311	Quechee, 1903 Morgan, 1903	Quechee	80	{ Alex. McInnes, Master Mabel Alexander, Lecturer Alice M. Rogers, Secretary		2d and last Wednesdays
312	East Montpelier, 1903 Bell, 1903	East Montpelier	115	{ G. H. Clark, Master Mrs. H. H. Templeton, Lect. C. P. McKnight, Secretary		1st and 3d Wednesdays
313	Calais, 1903 Dow, 1903	Calais		{ F. L. Warren, Master I. G. Robinson, Lecturer Josephine Converse, Secretary		
314	Rutland Valley, 1903 Morse, 1903	Rutland	120	{ G. A. Davis, Master H. E. Colburn, Lecturer E. S. Slade, Secretary	Center Rutland	2d and 4th Saturdays
315	Middlebury, 1903 Morse, 1903	Middlebury	125	{ George H. Chaffee, Master Miss Mary E. Cady, Lecturer Miss Edith M. Shedrick, Sec'y		2d and 4th Fridays
316	Grand View, 1903 Morse, 1903	Addison	71	{ A. T. Clark, Master Mrs. C. H. Marshall, Lecturer Fanny Sears, Secretary	Vergennes Vergennes Vergennes	1st and 3d Fridays

317	Valley, Hammondsville Morgan, 1903	47	{ E. W. Wilkins, Master Mrs. D. C. Hawkins, Lecturer B. R. Wilkins, Secretary	Felchville Felchville	1st and 3d Saturdays
318	Maple Valley, South Wallingford.. Priest, 1903	95	{ George W. Kelley, Master Mrs. Ethel A. Roberts, Lect. Mrs. Ann N. Brown, Sec'y		1st and 3d Tuesdays
319	Glebe Mountain, Windham	59	{ W. G. Adams, Master Mrs. J. O. Sawyer, Lecturer H. L. Gould, Secretary	Chester Chester	2d and 4th Tuesdays
320	Waits River Valley, West Topsham Bell, 1904	116	{ S. M. Hood, Master J. A. Dow, Lecturer L. F. Sanborn, Secretary		Once in 2 weeks from Jan. 13
321	Chester, Chester Depot	32	{ E. A. Edson, Master Viola E. Gregory, Lecturer Mrs. E. M. Farr, Secretary	Chester Chester Chester	2d and 4th Fridays
322	Passumpsic Valley, Passumpsic		{ B. R. Smith, Master	St. Johnsbury	2d and 4th Tuesdays
323	Hardwick, Hardwick		{ F. C. Bell, Secretary W. H. Wheatley, Master Mrs. C. D. Wheatley, Lect. Miss Belle Morse, Secretary		2d and 4th Fridays
324	Teago, South Pomfret		{ Willis Wheeler, Master Mrs. H. H. Totman, Lecturer Mark Boynton, Secretary		1st and 3d Saturdays
325	Danville, Danville		{ Dr. C. E. Libbey, Master S. Waterman, Lecturer Ella O. Page, Secretary	North Danville	2d and 4th Tuesdays
326	Putney, Putney		{ G. P. Alpin, Master C. D. Britton, Lecturer A. J. Ayer, Secretary		
327	Gassetts, Gassetts		{ Mrs. F. O'Champaugh, Master Mrs. Myron Chandler, Lect. Minnie Lawrence, Secretary	Chester Depot	Saturday evenings once in 2 weeks, beginning Dec 31, 1904
328	Beaver Glen, New Haven		{ D. A. Roleau, Master Miss M. F. Landon, Lecturer Daisy V. Potter, Secretary		
329	Mount Philo, North Ferrisburg		{ H. H. Kingsland, Master Mrs. H. H. Kingsland, Lect. C. R. Folsom, Secretary		

330	Bennington, Bennington Bell, 1895	{ C. A. Rice, Master Mrs. Wm. Hicks, Lecturer E. Harwood, Secretary	
331	Prospect, Lincoln Morse, 1905	{ Ernest Dodge, Master Mrs. Fred Jackman, Lecturer Mrs. J. A. Bean, Secretary	
332	Cascadnac, Hartford Bell, 1905	{ C. D. Hazen, Jr., Master May R. Mead, Lecturer W. A. Wood, Secretary	Bristol
333	Strafford, Strafford Bell, 1905	{ W. F. Scribner, Master Mrs. Fred Hazelton, Lecturer Mrs. Florence Scribner, Sec'y	
334	Timmouth Valley, Timmouth Bell, 1905	{ Bartlett Stafford, Master B. L. Stafford, Lecturer E. C. Taylor, Secretary	
335	University, Norwich Morgan, 1905	{ F. W. Fitzgerald, Master G. E. Loveland, Lecturer A. L. Douglas, Secretary	
336	Tyler Branch, Enosburgh Falls Bell, 1905	{ W. G. Passet, Master F. W. Spicer, Lecturer J. A. Leash, Secretary	

SOME RESULTS OF CULTIVATION AND PRUNING ON A YOUNG ORCHARD.

BY A. M. VAUGHAN, RANDOLPH, VT.

How many farmers would think of planting a field of potatoes, corn, or any other hoed crop and expect to harvest a paying crop, if they left it without cultivating or hoeing? Not one! They know beforehand just what the result would be. Yet in nine cases out of ten this is just what is being done with the fruit trees that are being planted in the State. Just why this is so would be hard to tell. Probably because it is the custom and it is so hard to get out of the ruts that we stay in them.

Practice has proven that a crop of trees is not unlike any other crop as regards its ability to respond to cultivation. A tree planted in sod land and left to shift for itself will, if properly planted, live and make some growth. But once having seen trees that are kept cultivated, the neglected tree becomes unsatisfactory.

In this climate, apple and pear trees should make a growth of one and a half to two feet and plum trees three feet at least. Fertilizers may be used to help out but cultivation is the main thing. It does for a tree just what it does for a stalk of corn, keeps the weeds down, liberates the natural fertility of the soil, and saves moisture. The latter is the most important as moisture is the medium through which all plants get their food. If moisture is present the plant food is dissolved and is ready to be taken up by the first thirsty plant. Then keep the weeds out of the way and the tree gets the full benefit, and almost invariably makes a good growth.

Cultivation is more important to pear trees than any other kind of fruit as they make all their growth before July 1st. So if they do not have a good chance during their growing period a poor growth is the result. Any attempt to prolong their natural period of growth results in unripe wood, almost sure to winter-kill, and subject to every disease tree is heir to. Other kinds can be kept growing until about August. Trees will nearly always stop growing at this time of year if not



FIG. 1

Branches too close together, requires pruning in the center.



FIG. 2

Branches too far apart, requires pruning on the outside.

cultivated. If they do not some kind of a cover crop can be sown. That will draw the current of moisture away from the roots of the trees and the rest of the season can be used in ripening the wood.

If any crops are grown among the trees, fertilizers must be used or the trees will suffer. If root crops are grown select such as do not require digging until late fall, when there will be no danger of starting the trees growing by stirring the soil. No special kind of plow or harrow is needed. Young orchards should be plowed, as comparatively deep cultivation keeps the roots down deeper and the trees are not so easily affected by drought.

PRUNING.

Pruning should go hand in hand with cultivation. It is difficult to determine which is the more important. Take a late planted tree and a severe pruning will many times save its life. The reason for this is not hard to see. The natural time to plant trees is during their dormant period, but many times we wait too long and the leaves start. Then when the tree is moved its connection with the soil moisture is cut off and the leaves draw directly from the tree and dry it out. Now if the top is nearly, or quite, all cut away it gives the roots a chance to get hold of the soil moisture before new buds have put out. Another reason for a severe pruning at the time of planting is, that in digging, two-thirds or more of the roots are left in the ground, so we should prune off a corresponding amount of the top. This directs the growth into a fewer number of buds and we get a few good branches instead of a lot of poor ones.

In succeeding years we prune to shape the tree to our ideal. A low-headed tree with an open top is the best. To get this, select three or four branches after the tree has grown one season, head them back to fifteen or eighteen inches, leaving the ends nearly on the same level; then prune off all the other branches. The next year leave two branches on each of these, heading them back to twelve or fourteen inches. This method followed up for three or four years gives a good framework, and by shortening or heading back the main branches they grow thicker and in later years are less liable to break down under a load of fruit.

The main branches of the first two years should be kept clean from fruit spurs. As blight always starts in the blossom it will avoid losing any of the main branches. In later years the annual pruning is an easy way to thin the fruit.

It will be found that different varieties require different treatment. Some like fig. 1 grow upright. In this case most of the pruning must be done from the center. Fig. 2 is a Burbank plum. Note the peculiar sprawling habit of growth; here most of the pruning must be done on the outside. Fig. 3 presents an ideal top to select from. In each illustration the season's growth is from where the person's hand is placed in the top.

BENEFITS OF THE BABCOCK TEST.

BY S. C. THOMPSON, DAIRY INSTRUCTOR OF MAINE.

SEPT. 16, 1905.

Since the advent of the Babcock Test, great changes have taken place in the dairy work of this country, and very largely for the better, though like almost everything in this world, it has its draw-backs, nevertheless everybody who is interested in the keeping of cows, is interested or should be, in this test and its manipulation.

People are interested to a certain extent, yet in a majority of instances their interest ceases before they have become familiar enough with its workings to have one in their own dairy room and to see to it that it is in operation. Like many of us they are anxious to know what somebody will tell them but don't make an effort to find out for themselves, which in this case is stopping short of the reward, for there are today too many people who do not believe in its accuracy simply because they have heard their neighbor say so or else have guessed of its inaccuracy from the fact that their returns from the factory are not as great as they think they ought to be or else their test is lower than for the month previous, which to them is positive evidence that the difference is due to the inaccurate work of the test or its operator, but in either event if the person has a personal knowledge of the test and has used it as he ought, he can soon find for himself that these variations are there. So far as accuracy is concerned, it has been shown over and over again that it is as accurate as any chemical test and more accurate than any previous test for determining the amount of butter fat in milk but if people are still skeptical, let them make several tests themselves of the same sample, then they will see by their uniform results that varia-



FIG. 3
An ideal form.

tions are not noticeable, but when it comes to taking *different* samples into consideration, then variations occur, but rather than suppose that the test is wrong, remember that samples are not alike, for two samples of milk from different milkings of the same cow or from two cans of cream from the same separator are very likely to vary, though many of the variations come from improper sampling which the test is not responsible for. If we can only come to see that our samples are continually varying, then we will consider all the more, the necessity of making tests and realize that our results may never be the same when we test different samples. I would not however, give the impression that the test gives accurate results without careful manipulation nor do I mean that a dishonest person will give honest results, for care, accuracy and honesty on the part of the tester are absolutely essential, and in fact, the more these essentials are practiced the better the results will be.

It is a fact that any person with ordinary intelligence can learn in a short time to do accurate work with the Babcock Test which makes it all the more unreasonable for them to suspect the results until they have done the work themselves, tested their own samples and made comparisons with those at the factory.

No person has any more right to accuse dishonesty in making tests, without knowing for himself the truth of the statement, than to accuse another of any crime without any knowledge or proof, for it is a crime to cheat with the test as much as it is to cheat in weight.

The invention of the Babcock Test was made necessary by the demand of dairymen for a simple and accurate method of determining the fat content of milk by which the quantity of butter in the milk of each individual cow could be determined.

The value of a cow had been found to be in the amount of butter that she would make each day, instead of thinking a cow was a cow no matter how much milk or butter she would produce, and the only way to test her accurately was to set her milk and churn the cream separately, which had a good many difficulties attendant to it, besides the great amount of time which was necessary to test 20 or 30 cows, each separately, so some method that would require but little time to operate and give accurate results was necessary and the Experiment Stations set about to find such a machine and no less than eight different tests were invented by the different Stations, but on account of the simplicity and accuracy of the one invented by Dr. S. M. Babcock, chemist at the Wisconsin Station, it has displaced all others and has come to be accepted by the whole world, to which it was given without any gain to its inventor, a means so simple that anyone who will, may operate it, and thereby de-

termine the value of each individual in the herd by her ability to produce that constituent of milk which practically determines its value, so far as cheese and butter making is concerned, butter fat. This machine has been invented for our advantage if we care to use it, yet how many neglect it, put it off.

Before the advent of the test, the methods used by factories, particularly where butter was made, of declaring dividends was simply by the number of pounds of milk or the number of inches or spaces of cream furnished regardless of the amount of butter that it would make, the unfairness of this method was very plain when we consider that 100 pounds of milk will make from three to seven pounds of butter, and the patron furnishing milk yielding the former was receiving more than twice what the latter was getting for butter fat or butter which was the finished product sold.

The variation in cream is fully as great, requiring from 5 to 14 spaces to make a pound of butter, this method of paying always put a premium on the poorer product and had a great tendency to make any dishonest ones adulterate their milk with water and their cream with skim milk, which was detrimental not only to the factory itself but to the honest producer.

With a Babcock tester in every factory, the amount of butter fat is determined in each patron's lot of milk or cream and he is paid for whatever he sells, not for the water or skim milk but for the butter fat, and by this means the careful patron who takes pride in his work, gets pay for his entire product and does not have to help out on an undeserved price of a slack or dishonest neighbor.

What is true of butter is equally true with cheese, for it is now known that the value of milk for cheese is in proportion to the amount of fat it contains, the milk with a larger fat content produces a correspondingly large amount of cheese of better quality and vice versa.

Any and every method of pooling milk or cream always puts a premium on the poorer quality but the method of testing each and every lot places the value where it belongs and gives each patron a much fairer settlement. It is necessary that all testing be done in factories by competent, careful, experienced and honest men for a small error on the little sample means a large variation on the whole lot and it is not surprising that we hear murmurings of discontent among patrons, for many factory testers do not measure the responsibility of their position, they are hired servants working for daily pay and their errors have to be borne by somebody else with no loss to themselves, and one of the problems to be overcome is the elimination of the incapable men and the strengthening of the confidence in the

machine which has already put the industry on a safer, fairer and more solid basis than before and laid the foundation for a brighter future.

S. C. THOMPSON.

FUNDAMENTALS OF FORESTRY.

BY B. E. FERNOW OF ITHACA, N. Y.

It is an old experience that this world is moved by emotions rather than by reason. When we have succeeded in enlisting the heart for a cause, our arguments need not be so strenuously correct or cogent. We accept as truths readily, what appeals to our emotions.

Economic reforms, such as the one your association is engaged in, while, of course, in the first place based on economic arguments, find popular support through appeals to patriotism, to public spirit, to a regard for the general welfare, rather than through a clear, coherent, systematic presentation of the arguments which a business man demands.

Yet, while general sympathy with your efforts in securing an intelligent treatment of forest properties may be and must be aroused by these general appeals, if you wish to take definite steps in forwarding your reform, you must come down from generalization to definite concrete facts, you must distinguish between the ideally desirable and the practically possible, you must in a measure at least become familiar with some of the technical details, the fundamentals, which need to be considered in devising practical measures of reform.

The attempts at forestry reform even in your state are nearly a quarter century old. The report of your Forest Commission of 1882 contains much common sense and many good suggestions; yet it has remained, as far as I know, all these years without any practical consequence. And that in spite of the fact that the sympathy of such good practical business men as your former Governor and present Senator, Redfield Proctor, was really fully aroused.

What is the reason of this apparently entire lack of practical results from this early movement? Why was nothing done to improve matters? Partly, I believe, because the necessity for action was not pressing at the time, and partly because the sub-

ject was after all too much "in the air," poorly understood in its fundamentals, hazy in the minds of even those who felt that something was wrong, something should be done, although they did not know what and how.

Times have somewhat changed since then; much more information is abroad on the subject, the need for attention much more pressing and therefore much more hope of inaugurating practical measures.

To assist you in devising such measures I propose to discuss somewhat systematically some fundamental conceptions which one must keep in mind when formulating a forest policy.

Everybody interested in the subject knows, of course, that a forest does, or may, fulfil two functions in the economy of man. It does, or may, furnish valuable material, and it does, or may influence climate, soil conditions and waterflow. If we have in mind the first function we speak of supply forests; if the latter function is prominent, we speak of protection forests. The first function, that of supplying us with material for the ten thousand uses to which wood can be applied, is of course, obvious and has been so from time immemorial, but the protective quality of a forest growth, while suggested time and again by careful observers even in antiquity, has been realized and definitely investigated only within the last 50 to 100 years, and, we may say at once, its full bearing is not yet understood, and, in some directions at least, its practical importance is still in doubt.

That any and every forest growth, nay a single tree, exercises some influence upon its surroundings, any student of natural philosophy who knows of the interrelation and interaction of things in general, will readily admit. But how far this influence is of practical value to man and important enough to enter into his considerations of economic life, that is another question. Grant, for instance, what has not as yet been proven by any means, that forests influence rainfall—and that means as is usually assumed, that they increase the same—two practical questions would still arise, namely whether such increase would be beneficial or the reverse, and whether it would be of sufficient moment to make the preservation of a forest growth desirable on ground that might be better used for farm crops. In some regions, as in the dry plains, the increase of rainfall would be welcome, but in other regions, as in your own State, for instance, it may be the very opposite. From this simple contemplation it is at once obvious that we must discriminate between the general truth and its practical application to different localities.

The same discrimination is needful with regard to the influence on soil conditions and waterflow. While the removal of forest growth on shifting sands becomes detrimental not only to the soil itself, but also to neighboring fields, which may be covered up by the unstable moving sands if access is given to the winds, there is no reason why the stable agricultural soils should be kept wooded. Similarly while the steeper slopes with thin soil, and rapid surface drainage, would lose this thin cover by washing and become useless if deforested, there is no reason why the gentler slopes should fall under the same necessity of keeping the forest cover.

We see, then, that the value of this forest influence varies with the conditions of each situation and in practical considerations of a forest policy we must avoid sweeping wholesale generalizations and become specific as to the protective character of forest cover in each case. We can therefore formulate the first fundamental:

The protective quality of a forest cover depends on locality and situation, and unless it can be definitely shown in each given case that a really tangible and desirable influence exists, the protective argument can have no standing.

There are very few localities where the need of absolute forest preservation for the mere climatic or other physical influence exists. These are mainly found in the higher mountain regions with steep slopes where, by the nature of things, in many or most cases no reason exists for denudation and the kind of forest growth which suffices for protective cover, unless prevented by fire or pasture, readily maintains itself. Besides, almost everywhere this protective forest influence can be preserved as an incident while the forest is utilized for its material; merely the manner of utilization needing to be modified.

These truths cannot be too strongly impressed upon forestry reformers, for much mischief has been done in the name of forest preservation by making it synonymous with non-utilization, declaring trees holy and harvesting them a crime. The most astounding ignorance in this respect has been exemplified by your neighbor State, New York, in forbidding the cutting of trees, dead or alive, on State lands and, after a demonstration had been inaugurated to show that forest preservation does not exclude forest use, abolishing this demonstration through political trickery and by appeal to this ignorance.

We cannot too much appreciate the service which President Roosevelt has done to the forestry cause by simply accentuating this fact in words which should be the motto of every forestry association: "The fundamental idea of forestry is the perpetua-

tion of forests by use," which I formulate into my second fundamental:

The forest like all life is preserved not by non-use, but by regeneration, a succession of generations. And this succession can only be secured by the harvest of the old crop, establishing the new crop during or after the removal of the old.

It is only since the large bulk of our seemingly inexhaustible timber wealth has been used up that we begin to realize how dependent the development of our civilization has been and still continues to be on the material which the forest furnishes, and how puerile the cry of the earlier forestry reformers to stop the lumberman.

When you consider that over \$600,000,000 of capital is invested by lumbermen to make the material of the forest useful and that this material furnished by our forests annually to our use represents a round \$1,000,000,000 or more, you will readily realize that the lumberman cannot be stopped unless you stop your housebuilding, manufactures of furniture, cars, boxes, barrels, paper and the use of the innumerable things made of wood. It may, to be sure, be possible to find substitutes for this material—and such are constantly being found and supplied—but the enormity of the present consumption and the desirability of the material is such that there can be little question of the necessity of a continuance of wood supplies.

I have no doubt we could without harm reduce the enormous wood consumption which our great timber wealth has induced to one-quarter and even to one-sixth of what it now is, for Germany consumes about 15 cubic feet of log material per capita and England can get along with 13 cubic feet as against our consumption of over 80 cubic feet per capita. But even this minimum necessity will call for special effort to provide it when the virgin forests have been all cut.

In this connection the very remarkable fact should also not be overlooked that, instead of reducing their per capita wood consumption as the supplies become less and dearer and iron and steel cheaper, all civilized nations have within the last 40 years constantly increased their wood consumption at a rate of from three to five per cent. per annum. Another fact is significant, that England, the country of coal and iron, importing nearly all her wood supplies, produced last year only \$120,000,000 of pig iron while she bought from other nations \$125,000,000 of wood.

In the face of these facts we come to the realization that the supply argument is one of great, nay in my opinion one of much greater importance at present in the advocacy of rational forestry than the protective argument.

One very important feature in the question of forest supplies which is often overlooked by forestry reformers is that, while almost any kind of forest will answer for protective purposes, it is not wood but wood of certain qualities, forests of given species and character, which alone satisfy the lumber market. There are not only tree weeds just as there are weeds in the lower vegetation, but the relative value of the useful kinds varies greatly. All the ornamental hardwoods, of which the tropical world is still full could be destroyed without our missing much, for they are only beautiful; but the woods most used in our northern civilization which the tropic forest mostly lacks are the soft conifers, pines, spruces, firs, etc. Three-quarters of our present log consumption consists of these and only one-quarter of hardwoods.

Without going further in the discussion of this question I will now formulate a third fundamental.

The question of continued wood supplies of given character is one which requires at the present time as much, if not more attention than the question of protective influences.

I accentuate the *present* time. As long as an apparently endless forest wealth covered the country, which a relatively small population could hardly ever hope to reduce from a wilderness to a civilized condition, there would have been little call for exertion to secure a continuation of wood supplies. But now conditions are so changed that the exhaustion of virgin supplies within a generation is to be anticipated, if we continue to use wood as we do now. We must, therefore, look ahead to forestall any deficiency. Thirty years seems to be a long time hence to borrow trouble now, and the American, busy with the present, is inclined to leave the future to take care of itself. He is inclined also to think that when the need arises, there will be a way found and a result attained in a hurry. But there is one element in the production of a useful forest growth which no ingenuity of man will be able to overcome and that is the time element. There are Cheap-Johns in the country just now who recommend the planting of rapidly growing trees, like the Catalpa, to meet the coming timber famine. Curiously enough, just about 100 years ago, when the Germans were in fear of a timber famine, the same Catalpa did service—on paper—to stave off the evil day. No doubt, for some purposes these inferior trees will serve, but our principal needs are supplied by trees which in the natural forest have required from 150 to 300 years and more to furnish the useful clear lumber and there is so far no method of accelerating the growth of sawlogs which secures a desirable result in less than 60 to 100 years.

I formulate at once the fourth and very important of my fundamentals, which must not be lost sight of by the forestry reformer.

The production of a desirable wood crop involves a time element, which counts by many decades, and hence, long before the necessity is actually apparent, there is need to look out for the future. Indeed it is this time element in forest production which accounts for the slow development of the forestry idea itself in our country.

Not only is it difficult to see so far ahead, to calculate conditions of supply and demand in an industry which even at present is, at least in regard to conditions of supply, poorly informed, but what interest has the present converter of forests, the lumberman, in such a distant future?—and he would appear the only agent in whose hand the future lies.

There are two ways of providing for the future of wood supplies, namely either to plant or sow the new crop after the old crop of nature has been harvested, or else to let nature do the sowing by leaving enough seed trees of valuable kinds, removing also the damaging shade of the less valuable kinds, the tree weeds, which Nature usually favors.

In addition, there is a method of lengthening out the time during which a given forest may furnish supplies, namely by leaving some of the trees already grown unused: limiting the cut to a certain smallest diameter, a measure which is now broadly advocated as desirable. It is evident that unless new seeding produces a new crop this measure only very partially meets the needs of the future: it merely defers the harvest and slightly increases the product of the same acres.

But what do all these methods of providing for the future imply financially? They imply that the owner of a forest property either make a direct outlay for planting, or spend indirectly, by extending time and space over which his logging operations must be carried on, removing brush and tree weeds to secure the natural seeding; or else he must leave something unused, which he might have used and turned into dollars, for the future. Upon this self evident argument I formulate the fifth fundamental, which those who would drive the lumberman to do better must not forget.

Financial forestry, i. e., conservative lumbering and reproduction of wood crops means curtailing or foregoing present revenue or making present expenditures for the sake of a future revenue.

This may, in the end, prove more profitable than the mere exploitation which our lumbermen now pursue, and certainly the forest administrations of Germany and other countries have

proved that, *in the long run*, such forest management is very profitable. But it is so *only in the long run* and the long run does not appeal to most private producers who prefer to reap all they can in the present. Here and there circumstances will exist which make a man look differently at this problem, and large corporations of continuous life, depending like the paper manufacturers for instance, on a continuance of supplies near to their factories, may be induced to adopt measures for such continuance. But in the main, human nature is inclined the other way: the present or at least a very limited future is the concern of the private individual.

We find, then, an antagonism of interests, namely the private interest, which lies in the present utilization of forest supplies without regard to the future, and the public interest, which lies in the continuance of such supplies for the future.

Unless human nature is different in the United States from that of Europe—and 30 years of life here has not shown me much, if any, difference—the selfish interests of the private individual will almost invariably be placed ahead of the really not less selfish interests of the public.

It is only fair, therefore, that the public should in some way pay for the taking care of its interests or else step in and do for itself what cannot be charged fairly to the private individual to do.

It has, hitherto, been supposed that the interest of the public was mainly, if not entirely, in the protective quality of forest cover and hence where this quality of the forest was of moment, the State, as representative of the public, should interfere with a use of forest properties which might result in damage to a neighbor or to a section of country.

It was supposed that the business of wood production, like all other producing business, might be left to private enterprise, regulated by the conditions of supply and demand. But it is now dawning on the public that this reliance is misplaced, in a business in which such a long time element is involved.

The experience of European nations has proved this and the modern tendency of their governments is to increase the State forests, which had come into their possession first only through peculiar historic development, but are now held, improved and enlarged, as a matter of proper economic policy. Prussia alone has spent for the last 40 years annually at the rate of not less than one quarter million dollars in purchasing and reforesting wasted forests and wasted farms, because private interest, even in that country of thrift, conservatism and high wood prices is not sufficient to take care of these wastes. The same policy is imitated elsewhere. Incidentally I may here in-

sert a sixth fundamental which we can derive from the policy inaugurated by Prussia of buying up waste lands and exchanging good forest lands for poor farms and forests; namely:

Forests can be produced on soils unfit for farm use; and hence, as far as no other considerations prevail, it is proper policy to devote to wood crops only lands not fit for food crops. Such poor lands produce wood crops more slowly, to be sure, and hence the time element is here still further accentuated and private interest in such lands and business is still further lessened.

Someone might point out that there is in Germany a large amount of private forest apparently in good condition and managed for continuity, for the various governments of Germany own only 34% of the total forest area; but if you inquire further you will find that about 18% belongs to cities, village communities, institutes and other public corporations over which the government exercises more or less direct control; a portion of private forests, especially in Southern Germany, is, by law, prevented from being cleared on account of its protective quality, and some 14% of the forest area belongs to private families as entailed property, i. e., owned in trust for the family by the oldest son and managed under government supervision, so that altogether probably not one-quarter of the German forest area is without some government supervision and that mostly in farmers' woodlots. And if you wish to see mismanaged woods in Germany you will be referred to this class of property. In other words, except under government restriction private interest has not found inducements for conservative management.

A seventh fundamental may then be formulated: *Private interest in conservative forest management is in general insufficient* to be relied upon for taking care of public interests, except under the stimulus of government aid or of government restriction. In the end the public must take care of its own interests, which is best done by State ownership.

This doctrine, I know, is entirely un-American as far as professions of principles are concerned, but in practice the principle of self help, which is supposed to be the true American principle, has been again and again set aside in the past and the tendency of government interference is growing in the present.

It would, indeed, be difficult to point out any field in our economic life where reliance on self help and on natural competition is less likely to produce good results and preserve desirable conditions and where governmental influence is more needful than in the treatment of our forest resources.

This fact has been, happily, although slowly and only half-heartedly, recognized by the Federal government and several

of the States. When we succeeded in 1891 in committing the Federal government to the establishment of forest reservations, reversing absolutely its long-established land policy, the most important step towards a sound forest policy was secured.

At present over 60 million acres have been so reserved, and although this acreage does by no means represent as much economically valuable forest and although so far it is not yet rationally managed, at least the beginning has been made.

Other States who have followed the precedent, at least in a tentative way, are Michigan, Wisconsin, Minnesota and more vigorously Pennsylvania. Your neighbor, New York, which was really the first State to create a Forest Reserve, namely in 1885, exhibits a curious history of inability to carry out consistently a well conceived policy, partly due to political incompetency, partly due to private greed, but largely owing to the very ignorance of the fundamentals of forestry which led to the insertion of a foolish clause in the Constitution of the State prohibiting the State from cutting any trees, dead or alive, on its property and decreeing that these lands shall in no way be improved. At the present time the State lands are mainly held as a game preserve and pleasure ground for the owners of summer camps and the true economic value of the forest and true economic forest policy has been lost sight of. It will probably take another decade to regain the lost ground.

Your neighbor to the east, New Hampshire, has also for many years supported a Forest Commission, without much further result, waiting for private charity to create a State Forest Reserve. Massachusetts has this year created the office of State Forester and thus has at least recognized this interest as a State matter, as have also the States of Maine, Indiana, Colorado and California in a similar manner. Others as long as 30 and more years ago gave bounties for tree plantations or exemption from taxes without any practical result.

Whatever you may think of the propriety of the State owning, and that implies managing, forest property for wood production or of the State assisting private endeavor in such management, directly or indirectly, there is one duty of the State with reference to this subject which even the most democratic Democrat, unless he be a Nihilist, will have to admit as a proper function of the State, and that is adequate protection of forest property against loss by fire.

That we have not been able yet to perform this first duty of any State organization, that it seems impossible to stop the forest fires which rage annually in all our States, is in the first place due to a low state of public or civic morality; if communal sense or communal interest among the people were behind the

laws that are on the statute books of every State, it would not be difficult to get rid of this bugbear.

Your own law, recognizing only wilful and malicious incendiarism and overlooking negligence, is left to execute itself as in most other States and hence remains a dead letter. To stop the nuisance a regular organized active effort is necessary, such as is now made in at least three or four States in imitation of the first example given by New York.

The damage done by forest fires in your State may appear to be relatively small because your woods are largely hardwoods. Nevertheless, wherever fire runs over the ground, not only are the seedlings, the aftergrowth, the promise of the future, doomed but, the litter being burned to ashes, soil conditions are impoverished. As long as such conditions exist, as long as at any time and with practically no redress, the crop of many years may be wiped out of existence, is there any inducement to enter upon a conservative forest management for private owners or for the State either?

A single experience of the discouragement which such a state of affairs produces may suffice to make you realize its meaning. A large operator in New Hampshire having been induced to treat his large holdings of spruce conservatively had cut over 100,000 acres or so with a diameter limitation. A fire wiped out of existence all he had left, and the forestry cause has one advocate less.

Hence I formulate the eighth and last fundamental, as self evident as I consider all the others to be:

No forestry, i. e., conservative forest management for continuous wood production, is practicable until forest property is at least as safe from destruction by fire as other common property. Until the morals of the public are educated and the capacity of the government developed to the extent of coping with this evil, the public must blame itself and not the lumbermen or other exploiters of the forest for malpractice in the use of this property.

Your first move, therefore, should be to secure the *sine qua non*,—safety of forest property, without which it is idle to talk of forest preservation, conservative lumbering or forestry.

I feel that by this discussion of first principles and self evident truths I have but little aided you in a practical solution of your problem. I might perhaps have done better to discuss the definite measures and steps by which such a solution may be reached.

But for such a discussion I can refer you to an address delivered at a similar occasion, namely before the Massachusetts Board of Agriculture, printed in their Proceedings for the last year, in which I have very fully elaborated on the various meth-

ods that have been, or may be employed by a State similarly situated to yours in establishing a rational forest policy.

Let me at least summarize what appeared to me the desirable actions in establishing such a policy, approximately in the sequence of their importance and effectiveness, the first two being of like importance and the effectiveness of the rest being dependent on these.

1. Improvement in the Forest Fire Laws, making them mandatory under State control, State cooperation and State organization with very definite liability for the damage caused by the fires and liability on the part of the towns for their prevention and extinguishment.

2. The appointment of a State Forester, if possible technically educated, in charge of the fire service and of the educational and other forestry interests of the State.

3. Encouragement by financial aid of all associations and educational agencies concerned in creating an active interest in forestry.

4. Acquisition by the State for forest reserves of those stump, brush and waste lands, which by their location and condition are of importance to the State at large and do not promise to private enterprise sufficient inducement to take care of them; and institution of a forest management for those lands including nurseries for the production of plant material for their own use and for distribution to would-be planters.

5. Encouragement of private owners to improve their woodlots and to plant up waste places by furnishing expert advice and plant material at cost, and by a just tax law—not tax release.

6. Encouragement of towns to acquire town forests by advice and by State loans, the State credit being used to guarantee the public domain fund of the town.

For your State, so mountainous that nearly one-half of its area is still woodland, a State in which during the last 20 years thousands of acres of land once improved in farms have relapsed into unimproved condition, there is certainly every incentive to make this natural forest area do efficient duty in timber production; for the rational policy of every State must be to make every acre as useful as possible.

This area of a round two and one-half million acres,* roughly exploited and uncared for as it is, produces still over \$6,000,000 worth of saw material and perhaps \$4,000,000 of cord wood, altogether \$10,000,000 worth. But without any systematic attempt to secure *valuable* reproduction or even to protect the natural volunteer growth, leaving it to the ravages of fires when the virgin timber is cut out, little more than firewood will be produced, while under proper care it would be capable of producing by the *annual growth* at least half the amount of what the present exploitation derives from it. Such a property represents at 3% a capital of \$16,000,000 dollars. The State of Bavaria, which is climatically and topographically very similarly located, owns about the same acreage of forest and under conservative methods derives from it an annual net income which has grown from year to year until now it amounts to over \$5,000,000 or over \$2.00 for every acre annually on the average. This handsome revenue from the poor mountain soil is secured by an expenditure of \$4,500,000 and by cutting only the annual growth which amounts to about 300 feet of saw timber and over half a cord of fuel wood on each acre. Why could not Vermont enter upon such a rational forest policy so as to secure similar benefit from its forest area? It is for your Association to educate your people to see the advantage of such a policy and to secure the necessary legislation.

GRASSES AND CLOVERS.

BY PROF. CHARLES S. PHELPS.

Our common grasses and clovers thrive best in a rather moist climate and on somewhat clayey tenacious soils. The New England climate is especially adapted to promote the growth of these forage crops. The rainfall is generally ample, in the early part of the growing season, to produce a vigorous growth on most meadow-lands, and the intermittent rains of the summer

*The land area of Vermont, according to the federal census of 1900, is divided as follows:

Total land surface.....	5,846,000 acres
Within farm boundaries.....	4,724,000 acres
Improved farm lands, including pastures.....	2,127,000 acres
Forest and waste lands within farm boundaries.....	2,597,000 acres
Forest and waste lands not within farm boundaries.....	1,122,000 acres

From the last figures should be deducted the amount of land used for manufacturing, quarrying, mining, etc., and the land in cities, villages, etc., used for residence purposes aside from farm homes. After all possible deductions for these reasons and omitting lands incapable even of supporting tree growth, Dr. Fernow's estimate is well within the facts.

usually keep the pastures green. The hot mid-summer weather, so common with us, favors the proper curing of the forage into hay. In addition to the favorable climate, most of our soils are well suited to grass culture, as they contain considerable potash, a fertilizing ingredient much needed by grasses and clovers. There are portions of New England too where limestone abounds and this constituent in the soil is also favorable to the growth of grasses and especially of clovers.

There is probably no part of New England better adapted to the growth of grass and clover than Vermont. This is shown by the high rank taken by her dairy products, both at some of our great expositions and in the open market. On the west side of the state, where the country is more level and large fields can be made, the growth of hay as a money crop may be made a profitable branch of agriculture. On many farms where good markets are near at hand, the coarse grades of hay such as timothy, can be sold to better profit than they can be fed on the farm. Grass and hay are so generally handled by machinery that they can be grown and harvested more cheaply than most of the cultivated crops. The cost of production for hay is less per acre than for corn, because the plowing, harrowing, seeding, etc., for hay does not occur oftener than once in four to six years, while for corn it is an annual operation. The cost of growing and harvesting hay need not exceed seven dollars per ton. During a period of five years the writer has kept an account of the cost of producing hay on two large farms and has found it to vary between \$5.00 and \$7.00 per ton, of barn cured hay. In most of our cities and larger towns there is a strong demand for good horse hay, and farmers can well afford to sell their better grades of timothy hay and feed the finer hays and those with a considerable admixture of clover. These finer hays and the clovers have a higher feeding value for dairy stock than timothy, while the latter is much prized by horse feeders.

In these times of close competition in dairying, it is important that the farmer should grow as much as possible of the feeds used by his stock. Nearly all of the dairy crops, possible to be grown in New England, belong to two great groups of plants, the grass family and the clover family. The former includes all of the meadow and pasture grasses and in addition the common cereals, such as corn, wheat, oats, and rye, while the latter includes all of the clovers together with alfalfa, vetch, peas, soy beans, etc.

In general, the plants of the clover family have a higher feeding value than those of the grass family. Grasses are rich in woody fibre and starchy products, but are deficient in nitrogenous matter or protein while the clovers contain much larger

proportions of protein. These protein substances are very important in milk production. It follows therefore, that the grasses and entire cereal grains are not fully suited to the best results in milk production, if fed exclusively. They need the richer protein products of the clovers to balance them up, or in other words to make up for the lack of protein. The true grasses and grains however, may be improved by adopting the most advanced methods of culture. This branch of the subject will be treated on later in this article.

COMPOSITION OF GRASSES.

The value of hay is dependent mainly upon two factors, the digestibility and the proportion of the various food nutrients which it contains. The percentage of digestible protein which the hay contains is one of the most important factors affecting the composition. From the table it will be seen that of the pure species of grass, timothy contains the lowest percentage of digestible protein, while orchard grass, red-top and Kentucky blue-grass are the richest in protein, containing about 5 percent, against a little less than 3 percent in the case of late cut timothy. From this table it will also be seen that rowen hay ranks with the clovers in composition. This is due to the fact that young immature grasses always contain a higher percentage of protein than those which are fully grown. The high feeding value of the clovers is also due to the high percentage of protein which they contain. Early cut clover will contain about twice as high a percentage of protein as our common grasses.

DIGESTIBLE NUTRIENTS IN HAYS OF COMMON GRASSES AND CLOVERS.

(From Mass. Expt. Station Report, 1901.)

	Protein.	Fibre.	Nitrogen-Free	
			Extract.	Fat.
Kentucky blue grass	5.1	22.4	24.4	0.9
Orchard grass	5.7	20.9	25.1	1.6
Red-top	4.6	20.3	32.4	0.9
Timothy	4.6	17.0	31.3	1.1
Timothy (late cut)	2.7	16.3	31.6	1.2
Mixed hays	5.3	19.1	29.6	1.3
Rowen	8.8	18.4	32.5	1.7
Alsike clover	10.9	14.4	30.1	1.3
Medium red clover	8.1	16.5	28.2	1.5
Peas and oats	8.6	19.8	23.8	0.6
Vetch and oats	9.1	20.7	22.7	0.5

DIGESTIBILITY OF EARLY AND LATE-CUT HAY.

The following table shows how the time of cutting affects the rate of digestibility. From this table it will be seen that the average percentage digestibility of the various nutrients in late-cut timothy is 5 to 13 percent lower than in early-cut timothy. The low rate of digestibility in the late cut hay is due to the storing up of tough woody fibre as the plant advances toward the stage of seed maturity. This woody material is much less digestible than the soft succulent cellulose, which is the form the woody fibre takes in the earlier stages of plant growth. The tough, woody fibre also encases the protein, starch and other food nutrients in the late-cut hay and prevents their being readily acted upon by the digestive processes.

DIGESTIBILITY OF TIMOTHY HAY, EARLY AND LATE-CUT.

Conditions of Cutting	Organic	Protein Percent	Fat Percent	Nitrogen	
	Matter Percent			Free Extract Percent	Fibre Percent
Early cut	..61.0	59.0	57.0	64.0	59.0
Full bloom	..67.0	60.0	52.0	72.0	62.0
Past bloom	..56.0	45.0	35.0	61.0	51.0
Two weeks past	.....52.0	45.0	55.0	59.0	43.0
Late cut	...59.0	50.0	58.0	64.0	53.0
Average of two lots "early cut"					
(a) ....	...64.0	59.5	54.5	68.0	60.5
Average of three lots "late cut"					
(b) ....	...55.5	46.5	49.0	61.0	49.0

HOW MAY WE IMPROVE OUR HOME GROWN FODDER?

There are two methods for improving the quality of our home grown dairy feeds. First, by selecting and growing the kinds of crops best adapted for feeding dairy stock, and second, by so growing and handling these crops as to improve their feeding value. A prominent dairyman from the central west has recently been visiting his birthplace in the East, and after his return home was asked, "What is the greatest drawback to the agriculture of your native state?" His reply was, "Too much timothy hay." Although this statement may be overdrawn, it is certainly true that timothy hay is being depended upon too much as a coarse fodder for dairy stock. While timothy is valu-

able as a hay for horses it is not, as ordinarily grown, what is needed for milk producing stock. Even horses cannot be expected to thrive on it, but with plenty of oats or other grain it will serve them as a bulky feed and is usually free from dust and dirt. When thickly grown and early cut, timothy hay may still be a valuable dairy fodder. In fact, the poor feeding qualities usually found in timothy are due more to bad management in growing and handling than to any real defects. The finer grasses like Kentucky blue-grass, fescue grass, small red-top or R. I. best grass, and common red-top are best suited for feeding dairy cows. These grasses make a leafy, small-stemmed form of growth, and are thus more tender, at the same stage of development, than timothy.

There are doubtless other grasses that have considerable value for growth on certain soils, but it is doubtful if there is anything to be gained by increasing the number of kinds. These have been well tried, and are not found wanting under the conditions of climate existing in northern New England. There is in fact more danger of loss in growing too many kinds together, than too few.

THE CLOVERS AND OTHER LEGUMES.

As was pointed out under the discussion on composition of hays, many of the plants of the clover family will produce hays of superior feeding value to that made from the true grasses. There are other characteristics however, found in the legumes that make their growth and use a matter of great importance to agriculture. Plants of the clover family have been long known to be valuable as soil improvers, but it has remained for modern experimenters to show why. The plants of this family are now often referred to as "nitrogen gatherers" while those of the grass family are called "nitrogen consumers." This means that the plants of the first group have the power of gathering nitrogen from the air, and of storing it up in stem, leaf, and root, and when they are plowed under of furnishing this nitrogen to other crops. The grasses including the cereals, on the other hand, must get their nitrogen wholly from the soil, and are rapidly using up nitrogen without adding any to the soil. In the growth of the clovers and their removal from the land it might at first thought, seem that nothing would be added to that particular soil. Recent experiments however have shown that in the case of crimson clovers about $\frac{1}{4}$ of the total nitrogen of the crop is found below the top of the soil, that is, in the roots. When clover land is plowed this nitrogen becomes available for the use of succeeding crops. Nor is this all, the stubble and any second growth will add

much to the nitrogen to be plowed under. In reality as high as 35 to 40 percent of the total nitrogen of the crop may be plowed under in the stubble and roots for the use of later crops. This means much as a means of improving soil fertility, and points out the need of making the legumes important plants in our rotation of crops, especially in dairy farming.

VARIETIES OF CLOVER.

The common red clover is the variety most commonly grown for hay. Unless grown on moist soil this is a rather early clover to grow with timothy and red-top and it does not always withstand the effects of severe winters in cold climates.

The alsike or Swedish clover is proving a valuable substitute for red clover in northern New England. This clover has finer stems and is rather more leafy than the common red. It usually comes into blossom ten days later than the red, under similar conditions, and besides is better adapted to moist clayey soils. This clover is well worth trial by the dairy farmers of Vermont.

The mammoth red clover is essentially like the common red, except it makes a coarser, more stemmy, vine-like growth. This variety is commonly grown farther west, but does not seem to be especially adapted to New England.

PREPARING THE SEED BED.

There has been a good deal of interest created during the past few years by the so-called Clark method of preparing grass lands for seeding. This method may be summed up under three headings.

1. A most thorough pulverization of the soil.
2. Heavy fertilizing with commercial fertilizers.
3. Heavy seeding.

The method recommended for pulverizing the soil is to harrow for a period of two months in the summer with a disk harrow. The soil is most thoroughly broken up to a depth of 6 to 7 inches and the surface soil is made very fine, by stirring the soil at least twenty-five to thirty times.

That there are great advantages in thorough pulverizing of the soil before seeding cannot be denied. Too little cultivation rather than too much is the common error. The advantages in thorough tillage may be briefly summed up as follows: (1) It kills the weeds or other foul growths. (2) It breaks up all lumps and provides more feeding surface for the small roots. (3) It lets in the air and allows for freer action by the oxygen.

(4) It sweetens the soil by aeration, and the consequent removal of acids. (5) It makes the soil warmer. (6) It provides a better place for the activities of soil bacteria. These bacteria are very essential for the preparation of plant food for the young plants.

Whether the large amount of cultivation recommended by the Clark system would be economical on all farms is perhaps doubtful, yet the writer does not hesitate to urge the importance of more thorough tillage than is commonly practiced. One who has not tried it, will be surprised at the benefits to be derived by harrowing a soil eight or ten times before seeding.

The second important point in the Clark method is the use of liberal quantities of commercial fertilizer consisting chiefly of finely ground bone mixed with nitrate of soda and muriate of potash. The use of 500 to 800 pounds at the time of seeding (about Sept. 1st) and of 500 pounds more in the spring is recommended, and furnishes a generous supply of plant food when added to what is prepared by the heavy tillage, which precedes seeding. In order to encourage a second crop, 200 pounds more is added after the first crop is cut.

The use of large quantities of seed helps to keep every inch of ground occupied with thrifty plants. By using a mixture of timothy and red-top the Clark method claims that greater weight of hay can be obtained than from timothy alone. The finer red-top occupies the spaces between the coarser and taller timothy and the two together no doubt occupy the land more fully than either alone. The rate of seeding advised is 14 quarts of timothy, and 14 quarts of cleaned red-top.

SEEDING GRASS LANDS.

There is probably no question relating to the cultivation of grasses in which there is so wide difference of opinion or of practice as regarding the best method and time of seeding. In general, methods of seeding may be divided into two. (1) Seeding with a nurse or protecting crop, and (2) Seeding to grasses or clover alone. Under the first of these methods fall seeding or spring seeding may be practiced. Probably the best nurse crops are rye and wheat. The use of these crops allows for fall seeding and gives the tender grasses and clovers a longer period in which to become established. In the more northerly climates on heavy, clayey soils, this method of seeding is often the best because the winter grain is not as likely to become thrown out by the heaving of the soil resulting from freezing and thawing as is the newly seeded grass when seeded without a protecting crop.

The chief drawbacks to seeding with a nurse crop are, first, in cases where the grain is heavy and lodges, the grass is often killed, and second, the young tender grasses are sometimes killed by drouth soon after the grain is cut. This killing by drouth most frequently happens in cases where the seeding is done with oats in the spring. Oats make a denser growth than rye or wheat, and the period for their growth being short the grasses sown on the same field are often very slender and weak and are readily damaged by drouth after the oats are cut. On quite moist, heavy clay soils however, spring seeding with oats is often the best method. When seeding with rye or wheat in northern New England, it is well to omit the clovers from the mixture and to sow these in the early spring before the ground becomes dried out, or they may be sown on a light, late snow.

During quite a period of years the writer has practiced the method of seeding with grasses and clovers alone, without a nurse crop. The best results have been obtained when the seeding was done in August. The advantages found in this method and time of seeding are, (1) It gives the crop full occupancy of the soil. (2) If the seeding is done early, it allows the crop to become firmly established before winter. (3) It is almost sure to provide a good crop the first season after seeding. In Vermont the seeding should be done about the middle of August and, for the best results the soil needs to be well manured after plowing, and the seed bed thoroughly prepared before sowing the seed. It is very important that the soil should have a heavy covering and the plants become well rooted before the ground freezes, and early seeding and heavy manuring will provide for this. Failures to get a good stand of grass are quite common where the seeding is done with a grain crop and light crops of grass may follow for a year or two, but by seeding early with grains and clovers alone and using 15 to 20 loads of manure to the acre, after plowing, a fine covering will be provided before winter.

It is a common error in seeding grass lands to sow too many kinds on the same field. Many commercial mixtures seem to be made up with the thought in view that if one kind fails enough will prove good to provide for a fair crop. It is not uncommon to find commercial grass mixtures containing species which vary as much as six weeks in time of blossoming. In growing mixtures of this kind some of the grasses will be tough and woody before other kinds are fully grown. Orchard grass or Kentucky blue-grass, for example, should not be sown with timothy or red-top. If early maturing hay is wanted it is better to sow orchard grass or Kentucky blue-grass each separately, or, in a mixture of the two. On moist soils the tall meadow fescue grown alone or with

a small proportion of timothy makes a valuable medium early hay. The chief difficulty with this grass is the high price of the seed. On the whole, there are probably no better kinds of grasses than timothy, large red-top, and small red (sometimes sold as Rhode Island bent grass). But for dairy feeding these grasses should always be grown with the clovers, and for Vermont conditions probably the alsike clover is the best as it makes a finer, richer feed than the red clovers and is much liked by cattle. It has proven more hardy in cold climates and better adapted to heavy clayey soils than the common red.

For the past three years I have used the following mixture in growing hay for dairy stock and have had very good results. Timothy 16 quarts, red-top 8 quarts, red clover 4 quarts, alsike clover 4 quarts. These quantities are thoroughly mixed and the mixture is sown at the rate of 22 to 24 qts. per acre, by means of a wheel barrow seeder. When seeding to get a good grade of horse hay free from clover, I use 16 quarts of timothy and 8 quarts of red-top per acre.

SEEDING PASTURE LANDS.

In growing grasses and clovers for pasturing the conditions are quite different from what they are when growing for hay. Instead of growing a few kinds together we need a mixture that will provide good feed throughout the season. Some grasses start early and provide good feed the first of the season while others make a late start and provide better feed in mid-summer. Then too, on pasture lands, we need a firm turf so as to prevent the surface from being cut up by the hoofs of the cattle. For this reason timothy should be entirely omitted from grass mixtures, to be used on pastures. Most of the clovers also fail to produce a firm turf and do not thrive under conditions of constant grazing. The small white clover is however most valuable for pasture seeding as it makes a thick mat-like growth and seems to thrive under conditions of constant grazing. The following mixture will be found valuable for pastures when used in these amounts per acre, Kentucky blue-grass 16 quarts, large red-top 12 quarts, Rhode Island bent grass 6 quarts, white clover 4 quarts. Kentucky blue-grass will furnish good feed early in the season and again in the fall but does not grow much in mid-summer, while the red-tops will thrive best through the middle part of the summer.

ADVANTAGES OF EARLY CUTTING.

As has been pointed out, earlier in this article, the percentage of digestibility is an important factor in regulating the feeding

value. Now the rate of digestibility is controlled more by the stage of development when the hay is harvested, than by any other factor. Soon after the plant passes the blossoming stage its energies are bent toward the work of seed production. During this same period the stem and leaf rapidly become hard and woody. The seed, if allowed to develop before cutting the grass, probably adds nothing to the value of the hay, as the small hard seeds are often shaken off in harvesting and if harvested are probably not masticated nor digested by the cattle.

Another factor to be considered is the higher degree of palatability of the early-cut hay. Animals do not thrive well on feed which they do not like. It is important that all foods should be relished by the animal if good results from their use are to be expected. There is still another factor affecting the feeding value which should not be overlooked, which is the labor of digestion. In the digestion of any food a certain part of its energy must be used to digest or make available the food nutrients. Whatever energy goes to the labor of digestion leaves so much less to go toward the building up of milk and flesh. The larger the tax on the energy of the food to carry on the labor of digestion the smaller will be the amount available for building up new products. It naturally follows then that early-cut hays will show a larger amount of available food nutrients than the late-cut. Some recent German experiments have shown that 10 to 12 percent of the total energy represented in tough woody fodders was expended in the work of digestion. Of course the energy so used is of no value for the direct production of that for which the animal may be kept, whether it be milk, meat or labor.

In addition to the three forms of loss in allowing grasses and clovers to become over-ripe, there is another in the case of some kinds of cured fodders, that is a tendency to the loss of the finer parts in drying. Clovers especially are more liable to lose their leaves during the process of drying, if the crop is allowed to stand until clover heads begin to turn brown.

HARVESTING AND CURING.

With the improved machinery now available for handling the hay crop there is little excuse for allowing the haying to drag for the greater part of the summer season. It is true that the labor of caring for the crop is greater when early cut, but this is more than counterbalanced by the higher quality of the fodder. Two days drying is ample when the weather is good, and where the hay is cut in the afternoon it can often be cured the following day. If there is no adhering moisture the hay may be stored when it seems quite green. The natural water of the crop will

be expelled by the process of fermentation and little harm will result if a large amount of hay is stored in one bay during a single day. Many make the mistake of scattering the hay over the entire barn, if it seems a little green. The result is that the heat of fermentation is less and there is a larger surface area for moisture to condense upon, and this affords favorable conditions for mold to form. If the hay is mostly clover more drying is needed than for the true grasses. But in this case the drying should be done as far as possible while the hay is cocked. Long drying in the sun causes the leaves to become crisp and brittle and they are readily lost in handling.

It is impossible to lay down fixed rules by which the hay crop should be handled in cutting, curing, and housing, because so much depends on weather conditions, kind of hay and degree of maturity, when it is being cut. A few general suggestions are all that is possible. First of all we would urge cutting in the early stages of growth, starting the haying even before the blossoming stage—on farms where large areas are to be harvested, so that much of the crop will not become over-ripe. If late cutting cannot be avoided owing to weather conditions, that which is cut late should be fed to young stock or horses rather than to dairy cows. Do the cutting if possible when the dew is off, either the latter part of the morning or else late in the afternoon, according to convenience and to the weight of crop. Use the tedder freely. There is no implement of greater value in all the operations of haying. If the hay is to be left over night there is little to be gained by cocking if the weather promises fair, except in case of clover hay. It is usually preferable to leave it in the windrow. The second day we always try to begin hauling before noon partly to prevent delay by having too many teams in the field directly after noon. As far as possible place a large amount of hay in one bay or on one scaffold during a single day.

HOW MAY WE KEEP UP THE FERTILITY OF GRASS-LANDS?

The average yield of hay, according to the census returns, for most of the New England states is a little over one ton per acre, yields of from three to four tons are however not uncommon on well managed dairy farms while Clark of Higganum, Conn., (the advocate of the so-called Clark System) claims yields of from six to eight tons per acre. The neglected condition of meadows on hundreds of farms shows that little is being done to improve the hay crop. That meadow-lands are often "run out" and filled with weeds, bushes and foul grasses and sedges. How may such lands be restored and be brought to yield moderate but yet remunerative crops?

In the first place, before much can be done toward increasing productiveness in the case of many soils, under drainage is absolutely essential. No soil will produce good hay if it is "water logged," or surcharged with water throughout the season. Such soils however are often among the most productive when freed from surplus water and brought into good physical condition. Another important factor in the improvement of grass lands is to alternate the grass and clover crop with the grains or other annual crops. In other words a systematic rotation of crops should be adopted. On most soils grass will not continue to yield well without tilling the soil once in three or four years at least. On a large dairy farm I have found the following rotation to prove very satisfactory. (1) Corn for silage, to be grown by plowing under turf in connection with the liberal use of stable manures. (2) Oats to follow corn, the soil to receive a light application of fertilizer. (3) Rye to follow oats without fertilizer or with possibly 200 to 300 lbs. of a good grain fertilizer. (4) Grass and clovers to follow the rye, for a period of three years. The grass and clovers are seeded clear, or without a protecting crop and the soil is most thoroughly plowed and harrowed, being harrowed at least 8 or 10 times during a period of three to four weeks after plowing down the rye stubble. Fifteen to twenty two-horse loads of stable manure are well harrowed in before seeding. It is important that this manure should be near the surface to start the tender young grass and clover plants into a quick and vigorous growth. Early seeding is of great advantage too, because the soil is warm in August and the bacteria of nitrification will be rapidly transposing the much needed nitrogen into a readily available form. This rotation requires that six fields be available and the size of each should be controlled by the amount of ensilage needed, judged by the average yield on the kind of soil and in the climate where the farm is located. In regions too far north to safely grow corn, potatoes might be substituted for the corn. But in this case we would advise (1) rye sown on turfland, (2) potatoes, (3) oats, and (4) grasses and clovers for three years. Clover may be sown on the rye ground the spring after seeding, to be plowed under as a green manure. This will provide a very valuable form of manure for the potatoes.

TOP DRESSING WITH MANURE OR FERTILIZER.

The grass crop is a large user of nitrogen. Unlike the clovers it does not take nitrogen from the air. But the clovers as a rule, are short lived, and do not remain in the newly seeded ground much after the second season, so these cannot be depended

upon to keep up the fertility. After the second year from seeding, grass lands need some fertilizer either in the form of commercial materials, or stable manure. Where the latter is available it should always be used, and preferably in the fall. On farms where quite an area of cultivated crops is grown such crops usually require most of the stable manure, so that the use of commercial fertilizers is necessary if the productiveness of the grass lands is to be retained.

Numerous experiments have shown that the chief fertilizing ingredients required by the grasses are nitrogen and potash, with relatively smaller quantities of phosphoric acid. For the past ten years the writer has been experimenting with fertilizers on grass lands, and is fully satisfied that where hay is worth ten to twelve dollars per ton they are a profitable investment. The nitrogen should be present in a quick acting form, such as nitrate of soda, sulphate of ammonia or nitrate of potash, while the best and cheapest form of potash is doubtless the muriate. If commercial mixtures are used, care should be taken only to use those with a liberal percentage of nitrogen and of potash. A mixture with four percent nitrogen, ten to eleven percent of actual potash, and six to seven percent of available phosphoric acid will give good results. During quite a period of years I have mixed fertilizers on the farm and where five or more tons are used, find quite a saving over the commercial mixtures. The homemade mixtures are in all respects as good or better than those costing several dollars per ton more in the form of commercial mixtures. A valuable and easily prepared mixture for grass may be made from 1000 lbs of acid phosphate, 400 lbs. of muriate of potash, and 600 lbs. of nitrate of soda. This mixture will contain $4\frac{1}{2}$ percent of nitrogen, $6\frac{1}{2}$ percent of soluble phosphoric acid and 10 percent of actual potash, and at prices for the spring of 1905 the materials would cost, at most New England points, \$30.00 to \$32.00. Four hundred pounds of this mixture per acre, costing not to exceed \$6.50, will often give an increase of one to two tons per acre. I have used essentially this mixture for a number of years, but on account of the high cost of nitrate of soda in the spring of 1905 I substituted nitrate of potash and made quite a saving thereby.

CAN THE FEEDING VALUE OF GRASSES BE IMPROVED?

In discussing the composition of grasses I stated that they were too low in protein for the best results in feeding. This leads to the question, Is it possible to improve the feeding value of the common grasses? This question has been studied by several of the experiment stations and especially by the Storrs Expt. Sta-

tion of Connecticut, between the years 1890 and 1900. As the writer had a part in conducting these experiments he is familiar with the work and feels free to make use of the results. In a series of experiments on an old grass field the crop on plots where no nitrogen was used, but mineral fertilizers were freely used, the nitrogen in the grasses (free from clover) was 7.2% in the dry matter, where 25 lbs. of nitrogen per acre was used there was 7.75% of protein in the dry matter, where 50 lbs. of nitrogen was used the protein was increased to 8.5% and where 75 lbs. of nitrogen was used the protein equaled 9.4%. It will be understood that all of the fertilized plots were supplied with mineral fertilizers (phosphoric acid and nitrogen) so that the varying factor was the nitrogen.

Similar experiments were made on pure species of grasses but on much smaller plots. These experiments were carried through quite a period of years. Five different grasses were studied and the percentages of protein in the dry food substance of the plants, from plots where mineral fertilizer only was used ranged between 6.69 percent of nitrogen and 8.16 percent; while where the largest quantities of nitrogen (75 lbs. per acre) were used the protein ranged from 9.07 percent to 12.63 percent. On the average, the five distinct kinds of grasses from the mineral plots (without nitrogen) gave 7.55 percent of nitrogen in the dry matter of the crop, while the same five gave an average of 11.12 percent of protein in the dry matter of the crop, taken from plots where 75 lbs. per acre of nitrogen was used as fertilizer.

The experiments indicate the possibility of increasing the quantities of protein produced upon the farm. When the feeding stuffs are high in price, it becomes important that the farmer should adopt every means to increase the supply grown. The supply of carbohydrates produced on the farm is usually sufficient for the needs of the herd, but the supply of protein is generally deficient. We can increase the protein by growing more of the clovers and other legumes, and we can also increase the quantity produced by the judicious use of manures and nitrogenous fertilizers on the grass crop.

What has been said about the use of nitrogenous fertilizers on grasses does not apply to their use on clovers and other legumes. Many experiments on this class of crops indicate that the percentages of protein in the plants are very little influenced by the use of nitrogen in the fertilizer.

SUMMARY.

In summarizing, we would call attention especially to the following points:

First:—The need of improvement in the hay crop is shown by the small yields per acre, the average yield in New England being a little over one ton. Grass is a profitable money crop when hay sells at from \$12 to \$15 per ton in nearby markets. The better grades of coarse grasses are usually more profitable to sell than to feed to dairy stock at ruling prices for dairy products.

Second:—The grasses should be grown with the clovers to produce hay of a high feeding value. The clovers are of more value as food for the production of milk, can be more economically grown than the true grasses, and will improve the fertility of the soil. Hay with a considerable proportion of clover in it makes a better balanced ration than hay from the pure grasses. A saving can be made in the use of the nitrogenous grain feeds when plenty of clover hay is available.

Third:—Greater care needs to be exercised in the selection of the kinds of grasses and clovers to be grown together. There is a tendency to grow too many kinds in one mixture, without regard to the time of blossoming of each. In growing grasses for hay, only kinds which bloom within ten days of each other should be grown together. The alsike clover is worthy of careful trial in northern New England.

Fourth:—In making seed mixtures for pastures, kinds should be selected which will produce a close, compact turf and give a variety of forage throughout the season. A considerable number of kinds may wisely be grown together on all pasture lands.

Fifth:—Hay, to be of highest value for feeding dairy stock, should be harvested early. Late-cut hay is not only less digestible and less nutritious, but requires extra labor on the part of the animal to make the food nutrients available. The extra energy used in the work of digesting tough, woody fodders lessens the available energy for building up animal products.

Sixth:—Great improvement in the grass crop is possible by the liberal use of nitrogenous manures and fertilizers. Nitrogen especially favors the growth of the true grasses. Old meadows may be made to produce from 1½ to 2 tons of hay more than they do with an outlay of from 6 to 8 dollars per acre, for commercial fertilizers with liberal quantities of nitrogen and potash.

Seventh:—In addition to liberal increase in the yields from the use of fertilizers rich in nitrogen the feeding value is also improved by their use. Mixed grasses from lands well fertilized with nitrogenous fertilizers have been found to contain considerably larger proportions of protein than grasses grown on areas where fertilizers were used which were entirely lacking in nitrogen.

CONCERNING SOME OF THE NEWER FEEDING STUFFS.

BY DR. JOSEPH L. HILLS, VERMONT EXPERIMENT STATION.

The dairy husbandmen of New England are well acquainted with the appearance, nature and value of the standard concentrates, such as the ordinary wheat offals, corn meal, oats, cottonseed meal and the gluten meals and feeds. During the last ten or dozen years, however, other candidates for favor have been offered in increasing numbers, many of which have now fairly well recognized places in stock feeding usage. Several of these, however, are comparatively new and the methods of their manufacture are but little understood by consumers. It seems worth while, therefore, briefly to outline some points as to their nature and usefulness. No attempt is made to cover the subject thoroughly; nor is the order of statement any indication of relative merit. The good and the bad, those which are deemed advisable to use and those which are held to have but slight merit are alike included.

OIL, MILL BYPRODUCTS.

Cottonseed Feed. Cottonseed meal has long been a standard concentrate. Cottonseed feed is a newer comer. It has not, however, proved to be an economical feeding stuff in New England. It is simply a cottonseed meal into which is mixed greater or less amounts of finely ground cottonseed hulls. Cottonseed meal should carry 40 percent and upwards of protein. Cottonseed hulls carry at the best not more than a tenth of this amount and the digestibility of even this small percentage is slight. This feed is offered at a price lower than that at which cottonseed meal is sold at and thus is apt to tempt the unwary. It is stated that it is sometimes artificially dyed yellow the better to deceive the buyer. Its identity may be easily determined by anyone through the use of the so-called "water cure" test as published in bulletin 101 of the Vermont Station. Cottonseed feed at ruling prices is a good thing for New England feeders to let alone.

GLUCOSE BYPRODUCTS.

Germ Oil Meal and Sugar Feed (Corn Bran). The usual concentrates which the glucose industry affords are the gluten

meals and feeds. Germ oil meal, which is less well known, as its name indicates, is made from the germs of the corn kernel from which the oil has been pressed. The initial step in the manufacture of glucose is to remove the skin or bran of the corn kernel and the germs by mechanical processes. The germs which carry two-thirds of the corn oil or fat of the kernel are cooked, the better to free the oil, and then subjected to hydraulic pressure to squeeze it out. Since corn oil has a higher commercial value for other purposes than it has in stock feeding, and since commercially it damages corn meal and its products it is well to remove the germ as is commonly done in making western corn meal. These germ meats, fairly well freed from oil, pressed hard as a board are then cracked and ground to make germ oil meal. This material carries from 20 to 25 percent protein and 10 percent or thereabouts of fat. It is well relished by cows and is an approved form of feeding stuff.

Sugar feed or corn bran is the outer skin of the corn kernel. Neither of these names are entirely correct ones and the first one in particular is highly misleading. The material contains little sugar, as such, and is not rich in protein. Neither is it a bran in the same sense of the word that the wheat bran is such. It has apparently considerably less feeding value than wheat bran or other corn products and as such is not, as a rule, to be recommended for cattle feeding.

Neither corn germ meal nor corn bran, as such, enter into the trade to any large extent. Both of these byproducts as a rule are mixed in with the gluten meal to form gluten feed.

BREWERS' BYPRODUCTS.

Malt Sprouts. When barley grains are sprouted in the breweries the starch is largely fermented by an enzyme called diastase, which is found in every sprouting barley kernel. When this process has gone on to a sufficient extent the sprouts are rubbed off mechanically, kiln dried and placed upon the market as a cattle food. These sprouts carry about from 25 to 28 percent protein. Considerable of this protein is in what is known as the amide form, one which is apparently much less serviceable than are the true proteids. Malt sprouts are not as a rule readily eaten at the outset. If, however, they are so thoroughly moistened as to form a sort of mash they are freely eaten by most cows. Such experimental evidence as is at hand indicates that this byproduct when offered in the kiln dried shape is well adapted to milk making purposes.

Brewers' Grains are simply the kiln dried residuum of the brewers' vats sometimes containing and sometimes not containing the malt sprouts. The starch is largely converted into sugar

and made soluble in the fermentation and passes into the beer, while the protein content of the residual grains relatively increases. Brewers' grains may carry anywhere from 22 to 30 percent of protein. They are light in weight, serve admirably mechanically to lighten the ration, are well relished by most cows, and have a good reputation as milk makers in those sections where they are most largely used.

In the immediate vicinity of the breweries it is a common custom for farmers to buy wet grains and either to feed them directly or to ensile them. Not infrequently these grains become extremely sour and odoriferous and thus, either through the animal system or because of the odor penetrating the milk in the stable, have caused milk to become tainted, have brought about digestive difficulties with people using the milk and in other ways proved unsatisfactory. This situation has been sufficiently acute to serve as excuse for legislation in some States where dairymen are forbidden to use moist grains. Condensed milk factories have likewise ruled them out of the dairies contributing milk for condensation.

This stricture, however, in no way applies to the dried products which impart neither taint nor other undesirable properties to the milk. It ought to be said moreover that the wet products when properly and intelligently used in moderation are not apt injuriously to affect milk. The brewers' byproducts do not enter into New England trade to any great extent.

DISTILLERS' BYPRODUCTS.

Distillers' Dried Grains.—This class of feeds is often not sold under its proper name. All sorts of fanciful and non-descriptive names are applied to them. While this custom is in no sense fraudulent nor at all reprehensible, yet there exists no good reason why they should not be sold upon their merits just as are cottonseed and linseed meals. Cows eating distillers' dried grains ingest absolutely no alcohol whatever; they are in no ways led aside from the path of rectitude and virtue; neither do they yield milk punch. Perchance if they did the demand for distillers' dried grains might exceed the supply. There exists however, one trade reason for attempting to disguise the true nature of these grains under non-descriptive names, viz.: parties conscientiously opposed to the liquor traffic might not purchase the goods if named correctly, whereas they would freely do so if they were ignorant of their true nature.

This class of material, (variously sold in New England under such names as Manhattan Gluten Feed, Continental Gluten Feed, Protegran, Climax Grains, Ajax Flakes, Merchants High Grade Dairy Food, Empire State Dairy Feed, Fourex and AAAA) as

well as under its proper title, is usually a byproduct of the distillation of alcohol or of spirits. There are three grades recognized in the trade: the highest made almost entirely from corn and the residuum of alcohol distillation; a second grade the product of the distillation of Bourbon whiskies, into which corn enters largely as an ingredient of the mash; and a third grade, the residuum of the distillation of rye whiskey where this grain is more largely used in the mash. The first grade carries usually from 30 to 35 percent protein and 10 percent and upwards of fat; the second 25 percent or thereabouts of protein; while the rye grains rarely contain 20 percent and usually considerably less than this. The higher grades are most often sold in New England. Within the last year or two, however, the rye grains have been sold somewhat freely.

A number of experimental feeding trials, carried out at the Vermont Station, as well as elsewhere, have thoroughly established the high feeding value of distillers' dried grains of the alcohol type. Their effect on the quantity of the flow is good and they likewise appear slightly to increase the quality of the milk, a result which is rarely attained with other feeds and which is perhaps due to the large quantity of the fat which they contain. The mechanical character of these grains is such as to make them on this account as well as because of their high protein content highly desirable ingredients of a dairy grain ration. Their advent into the State is to be welcomed.

BREAKFAST FOOD BYPRODUCTS.

Oat Feeds are often sold under proprietary names which afford no clue as to their true nature. These can hardly now be considered new feeds, yet there are many of these upon the market and their sale is vigorously pushed through advertising and through high commissions to feed dealers. Printer's ink has been liberally used to expose their deficiencies; institute speakers have declaimed against them; feeding stuffs inspections have pointed out their true nature, high cost and relatively low feeding values; yet notwithstanding they are largely used. There are, of course, in this as in all classes of feeds some which are better than others; some so poor as to be hardly better than ordinary oat hulls, and some sufficiently well fortified with concentrates to make a fair ration. Their numbers are legion—a recent New York inspection lists over seventy. Their protein content affords some clue as to the service which may be expected. Those low in protein should be let alone at any price. Those carrying relatively high percentages should be considered only if the price asked is low enough to warrant the purchase, a condition of affairs which the writer has not as yet found in several years'

study of the feed situation. As a whole these goods are made up of oat hulls, of light oats and of corn and corn products, fortified more or less at times with such concentrates as the gluten meals, linseed and cottonseed.

Hominy Feed, Cerealine and Maizealine Feed. Hominy feed or chop is a byproduct of hominy manufacture. The harder, outer portions of the kernel are separated from the softer or inner portion and from the germ mechanically, the former constituting the hominy and the latter the chop. Cerealine and maizealine are simply trade names for a sort of hominy and the feeds are simply hominy chops. The hominy feeds have had considerable repute as milk makers among New England dairy-men. The only experiments touching this matter have been made at the Vermont Station and published in the 17th Report and in the (forthcoming) 18th Report. The results were quite favorable to the hominy feed. The cow seems to find more therein than does the chemist. At ruling prices it is apt to prove somewhat better in dairy feeding than corn meal.

BEET SUGAR BYPRODUCTS.

The well known and effective diffusion process for the extraction of the sugar from the beet is employed by beet sugar factories. The roots are cut into slices and the sugar soaked out in immense tanks. The soaked residuum is either sold in a wet condition to nearby farmers as a sugar beet feed, to be fed directly or to be ensiled; or it is kiln dried and sold as dried sugar beet pulp; or, in some cases, molasses is mixed with it and it is sold as dried molasses beet pulp. These feeds have recently appeared in New England markets. None of them carry any material quantities of protein, even the kiln dried products rarely containing as much as 10 per cent. Hence they obviously are not calculated to narrow a ration. The value of the wet products naturally depends mainly upon the amount of moisture they contain. At the present writing moist beet feed is being offered in New England at from \$4 to \$5 a ton in carload lots. A sample sent by the manufacturers to the Vermont Station was found to contain 89.76 per cent of water or but a trace more than does skim milk. It carried 0.87 per cent protein or 17 pounds in a ton. The average percent of moisture in ordinary feeding stuff may be assumed to be 10 percent. This material at \$4, assuming the sample properly represents actual sales, would be equivalent to the dried product at 35 dollars a ton f. o. b. the nearest home railroad station. At this latter price, in view of its low protein content, and the increased carriage charges for the high water content is not a great bargain. One can buy at \$30 in cottonseed meal 860 pounds of protein; hence paying \$35 for 150 pounds is

a rather unwise proposition. One would naturally expect, moreover, that so fluid a material containing still some undissolved sugar would ferment and sour rapidly. In cold weather such a feed might be kept and fed to advantage at a distance from the factory; at other times in the year its storage seems inadvisable.

Dried beet pulp whether mixed with or unmixed with molasses is well relished by cattle. They do fairly well upon it. But at the prices for which it has been offered of late in New England markets it is an expensive source of protein. In trials at the Vermont Station dried molasses beet pulp, pound for pound of dry matter, was found equivalent to wheat bran and apparently equivalent to immature corn silage. At \$12 a ton, the sum for which it sold in 1903 in the sugar beet districts, it was probably worth buying; at \$20 a ton, the sum for which it was offered in Vermont markets, it was not as good a purchase as bran, even at the ruling high price for that concentrate nor was it deemed an economical substitute for corn silage. In short, it does not seem likely to prove to be an economical food for Eastern feeders.

MOLASSES.

Feed molasses is offered for sale for horses or cattle. It is recommended that it be fed in water, sprinkled upon a grain ration. It is sold also when absorbed in brewers' grains, being offered under the name of molasses grains. Beet molasses cannot be fed freely on account of its purgative action. A German experimenter states that two and three-fourths pounds daily per thousand pound cow is as much as should be used. Molasses carries considerable quantities of sugar but little protein. Its main service in dairy feeding, apparently, is to increase the palatability of the other feeds, thus inducing larger consumption of the other materials with which it is mingled. There appear to be some dangers associated with feeding this material, and so far as dairy cows are concerned it seems at present best to put this material in the doubtful list.

ALFALFA MEALS.

Within the past year or so alfalfa hay has been ground and offered in the ground condition. This may be bought in New England markets for from \$18 upwards. The total protein content is about 15 percent. The dry matter and protein are almost as digestible as those of bran. No experiments upon feeding this dry and ground material to dairy animals are known to the writer and such are under way at the present time at the Vermont Station. Whether or not it will

prove to be a desirable addition to the list of New England cattle feeds cannot be stated at present. It is offered as alfalfa meal and there are likewise proprietary feeds in the market of which this meal forms the basis.

NEW POSSIBILITIES IN POTATO CULTURE.

PROF. L. R. JONES.

UNIVERSITY OF VERMONT.

The potato is a staple crop in Vermont. In total production it outranks any other except grass. Yet it is the most variable of any crop in yield and the most liable to disease and failure. Is this an inherent necessity or is it because of the relative lack of intelligence or skill shown in its culture? I believe it is the latter; that the large proportion of potato growers have failed really to understand the potato and its management. If so, there must be some special reason for it. Without attempting a full explanation I wish to point out certain unique features in the development of the potato, which account in part for this failure to understand it. We cultivate the plant to secure the tubers. These are neither seeds or fruit comparable to those of clover, corn or apple, nor are they the enlarged roots of the plant like carrots or parsnips. The potato tubers are instead the swollen ends of secondary stems produced underground. Moreover the plant as we have it today in culture has been highly bred and rapidly developed into a thing quite different from the original wild plant of the Mexican and South American plateaus. There it tended to reproduce itself largely by seeds, as well as by small tubers. Man has bred and selected it to reproduce by tubers alone, so that now seed bearing plants are rarely seen. The plants do, however, continue to produce blossoms freely, and it is just as these are fading that the beginning of tuber formation occurs. The ancestral tendency of the plant at this time is to develop seeds. The tendency acquired by cultivation is to throw all the reserve strength into tuber formation. These reproductive processes cause a severe drain upon its vital energies, and the fortnight immediately following the blossoming period is therefore a peculiarly critical time for the plant, during which its very life

hangs in the balance. If once carried safely past this critical period and well started toward tuber formation, with foliage healthy and abundant, its life may be prolonged for many weeks, indeed almost indefinitely; but if during this critical period the plant is seriously weakened by insects, fungi, or other agencies, so as to start it upon a decline, it seldom fully recovers. More usually under these conditions it succumbs to the enervating process of tuber formation and soon dies.

The practical importance of this condition is apparent when it is understood that the entire crop of salable tubers is formed after this critical period is past, and that the full success of the crop depends upon retaining the healthy foliage for from one to three months after the blossoming period.

The following figures showing the time and rate of development of the potato tuber, were secured at the Vermont station by digging successive plots at intervals of ten days, beginning at the close of the blossoming season, the plants being preserved in healthy condition by spraying:

YIELD OF TUBERS AT DIFFERENT DATES. WHITE STAR POTATOES,
PLANTED MAY 20.

Date of Digging	Total Yield per acre	Yield of marketable size	Average size of tubers
Aug. 2	58 bu.	30 bu.	1.6 ounces
Aug. 12	115 "	75 "	2 "
Aug. 22	230 "	163 "	3.7 "
Sept. 1	304 "	234 "	4.4 "
Sept. 12	356 "	303 "	5.2 "
Sept. 22	379 "	353 "	5.7 "

In the majority of potato fields in this State the plants are all dead by the last week of August, yet in the case cited above, which fairly represents average conditions, fully one-half of the marketable crop was formed after that date. The importance of maintaining the perfect health of the potato foliage during the last few weeks of its possible development is much underestimated.

The potato requires more water than do most plants; indeed, the production of a full crop demands that fully one-fourth of all the water that falls on the soil during the entire season shall be absorbed by the plant and either retained or passed off through its leaves. Moreover the time of most active demand for this water is at and shortly following the critical period.

The securing of this water supply is dependent upon three things; first, the water containing character of the soil, determined by humus content and thorough pulverization; second, surface tillage to conserve this; third, healthy foliage to carry on transpiration which is the pumping process in plants. Much of the so-called "blight" of potato leaves is really the physiological disease "tip-burn" due to insufficient attention to one or all of these factors.

Starch manufacture is scarcely second to water supply in importance for tuber formation; this occurs entirely in the green leaves under the invigorating influence of sunlight. The extent of healthy leaf surface is therefore an exact index to the capacity for starch formation. When it is remembered that one-half of the possible crop is formed after the third week in August the importance of the preservation of the healthy foliage through the early autumn becomes apparent. The average potato grower has no just conception of his dependence upon this late foliage for a full crop.

As evidence of this we are frequently asked whether by spraying or otherwise protecting the foliage we may not unduly stimulate the potato to "run to tops." In one case in our vicinity a man who had sprayed and thus secured a fine stand of healthy plants wrote and asked if he should not go over them with a roller to break them down and check their growth. Another was advised by his neighbor that he was ruining his crop and must cut the rank tops back. This was about the middle of August. He appealed to us for advice. Wishing to secure experimental data we offered to pay him for possible loss if he would cut back the tops by one-half in alternate rows in his field and report the outcome to the Experiment Station. He did so and secured a yield of 152 pounds per row where so top pruned as compared with 221 pounds where allowed to grow.

The result is the same whether the tops are cut off with a sickle as in this case or destroyed by blight or insects as so commonly occurs in August, where the plants are not protected by spraying. One season when the blight struck our field about the middle of August we had a gain of over 200 bushels per acre due simply to prolongation of the life of the leaves in this way. We have in previous reports of this Board and in Experiment Station bulletins discussed the advantages and methods of spraying. Suffice it here to repeat that as a result of trials extending now through fifteen consecutive years at the Vermont Station we have found the Bordeaux-arsenic-mixture to be an almost perfect "cure-all" for the diseases and insects attacking the potato. The following summarizes our experiments in spraying late potatoes.

GAINS FROM USE OF BORDEAUX MIXTURE UPON LATE POTATOES.

Variety	Planted	Sprayed	Yield per acre	
			Where sprayed	Where not sprayed
White Star	May —, 1891	Aug. 26, Sept. 8	313 bu.	248 bu.
" "	May 20, 1892	July 30, Aug. 13, 25	291 "	99 "
" "	May 20, 1893	Aug. 1, 16, 29	338 "	114 "
" "	Apr. 26, 1894	J'ne 16, J'ly 17, Aug. 30	323 "	251 "
" "	May 20, 1895	July 25, Aug. 13, 31	389 "	219 "
Polaris	May 15, 1896	Aug. 7, 21	325 "	257 "
" "	June 1, 1897	July 27, Aug. 17, 28	151 "	80 "
White Star	May 10, 1898	July 21, Aug. 10	238 "	112 "
Av'ge 3 var.	May 18, 1899	J'ly 26, Aug. 17, Sept. 8	229 "	161 " 68 bu.
Delaware	May 23, 1900	Aug. 4, 23	285 "	225 " 60 "
" "	May 25, 1901	July 20, Aug. 21	170 "	54 " 116 "
" "	May 15, 1902	Aug. 1, 20	298 "	164 " 134 "
Green Mt.	May 1, 1903	Aug. 10	361 "	237 " 124 "
Delaware	May 25, 1904	Aug. 1, Sept. 1	327 "	193 " 134 "
Average for fourteen years			289 bu.	173 bu. 116 bu.

Coupled with spraying we recommend as a result of our experiments late rather than early digging where rot is feared. That is to say, leave the potatoes in the ground for at least a week or two after the tops are dead. Where this is done there has been little loss from rot in the cellar.

While we have shown that thorough spraying with this mixture is a sure remedy against both fungi and insects and recommend it unqualifiedly for all later potatoes we appreciate the obstacles to its use. It means some extra expense for tools and materials and a considerable bother especially until one learns how it is easiest done. Every potato grower will therefore welcome the suggestion that there is promise of at least some relief from the necessity for it. This depends upon securing disease-resisting varieties of potatoes. The variability shown by man and the domestic animals in individual or racial resistance to specific diseases is admitted by all. Does this occur in plants? Yes, in some cases at least. For example, Russet apples do not scab, whereas Fameuse are especially liable to this disease; Red Astrachans show no rust on the leaves, while another variety alongside of them may have every leaf destroyed by this fungus. W. A. Orton of the U. S. Department of Agriculture has recently secured by selection a disease-resisting variety of the cow-pea and similar resistance in varieties of cotton and other plants has been discovered. These facts led Professor Stuart of the Vermont Station to seek by breeding and selection to secure disease-resistant potato varieties. His results up to 1904 are summarized in a recent bulletin (1) which shows that some varieties, like Rust

Proof, Dakota Red and some Mexican varieties and recent seedlings have a relatively high degree of resistance to both blight and rot. Owing to their poor quality or other defects none of these are to be commended without reservation at present for commercial growing.

The plant breeders of Europe also, especially the British Islands and Germany, have been for some years aiming to find disease-resisting varieties. Through the cooperation of the Department of Agriculture we were enabled to secure about 100 varieties of the most promising of the disease-resisting European varieties for trial by Professor Stuart at the Vermont Station alongside of the best American varieties. Several of these are resistant to both blight and rot in their native countries and there is good reason to hope that they may retain something of this quality when transported. In any case, these with the various wild species from Mexico may furnish a basis for Professor Stuart's breeding and selection. While an absolutely disease-proof variety is not to be expected, there is reasonable ground for hoping for much practical gain over the varieties now commonly grown in Vermont. Resistance to scab and other diseases is to be hoped for as well as to blight and rot.

The consideration of this matter of disease-resistance in potatoes has established our confidence in the possible revival of potato culture in Vermont. Statistics show a gradual decline in this industry. This falling off is natural, perhaps inevitable, if potatoes are grown primarily for food or starch as formerly. There are other sections where they may be grown more cheaply to supply this general market. I do believe, however, that more potatoes should be raised in Vermont in spite of this western competition. But the thing I would especially emphasize, now, is my conviction as to another possibility. I anticipate that American potato growers are soon to follow with profit the practice of the Europeans, viz.: to use seed potatoes from a northern source when they aim for the best results. In England, France, Germany and Italy alike, preference is given to northern seed, even at a price considerably in advance of local grown seed. The very best comes from Scotland. The crop produced by this seed excels, not only in general vigor and productiveness, but especially in disease-resisting powers. The result is that the bulk of the crop sold out of Scotland is shipped south for seed at an advance over the market price for table use. A Scotch potato merchant at Edinburgh told us that Scotchmen couldn't afford longer to eat their own potatoes, instead they sold them for planting and bought at a lower price English and Irish potatoes for their own tables. The same is true in a measure of grain and other seeds. There is an increasing recognition in this country of the superior

value of northern grown seed, especially of potatoes. Maine is shipping thousands of bushels south and west each year for this purpose. We predict a very considerable increase in this demand within a few years, especially as the importance of disease resistance is recognized as a factor in seed selection. It will, we believe, be found by experience that the highest degree of disease resistance will be secured only by selection among varieties with attention to maintaining vigorous strains and by careful attention to cultural conditions under the most favorable of northern climates. Vermont conditions both of climate and culture are unexcelled for such purpose. Disease resistance also seems a characteristic of certain of the recently originated strains and is apparently bound to decline with age. We would, therefore, advise potato growers and seed dealers to follow closely the developments as to the relative disease resistance of the newer varieties and prepare to improve the opportunity to revive potato culture in Vermont along these lines.

EXPENSES OF THE BOARD OF AGRICULTURE.

From July 1st, 1904, to July 1st, 1905.

George Aitken			
Services	.....	\$262 00	
Expenses	.....	173 37	
			\$ 435 37
Ernest Hitchcock			
Services	.....	188 00	
Expenses	.....	145 14	
			333 14
Dana H. Morse			
Services	.....	172 00	
Expenses	.....	118 71	
			290 71
C. J. Bell			
Services from July 1st, 1904, to Oct. 3,			
1904	.....	100 00	
Expenses from July 1st, 1904 to Oct. 3,			
1904	.....	71 22	
			171 22
F. L. Davis			
Services	.....	40 00	
Expenses	.....	29 92	
			69 92
J. L. Hills			
Services	.....	60 00	
Expenses	.....	33 07	
			93 07
George H. Terrill			
Services	.....	20 00	
Expenses	.....	11 64	
			31 64

Arthur M. Vaughan

Services	20 00
Expenses	11 87

31 87

Homer W. Vail

Services	16 00
Expenses	6 20

22 20

B. E. Fernald, at forestry meeting of Nov. 10....	50 00
P. W. Ayers, at forestry meeting of Nov. 10.....	14 70
L. G. Stockwell, views at meeting of Nov. 10.....	11 20
C. S. Phelps, institute work and expenses.....	77 93
E. N. Cobb, institute work and expenses.....	103 30
L. R. Jones, institute work and expenses.....	63 63
H. D. Holton, institute work and expenses.....	36 96
S. C. Thompson, institute work and expenses.....	45 19

 \$1882 05

MISCELLANEOUS EXPENSES.

Express and Freight on books, etc.....	\$ 56 15
Postage, Telephone and Telegraph	44 00
Advertising in State papers	40 45
Other Incidentals	11 50
Brown & Moore, Printing posters, circulars, etc.	49 60
Tuttle Publishing Co., Printing 2500 copies of "Vermont," half tone cuts for same, envelopes for "Vermont" and other ex- penses connected with job	824 94

 \$1026 64

 Total..... \$2908 69

REPORT
OF THE
THIRTY-FIFTH ANNUAL MEETING
OF THE
Vermont
Dairymen's Association

1905

Compiled by

F. L. DAVIS, Secretary



BURLINGTON:
FREE PRESS ASSOCIATION,
1905.

An Act to Promote the Dairy Interests of Vermont.

It is hereby enacted by the General Assembly of the State of Vermont:

Section 1. The sum of one thousand dollars is hereby appropriated annually to the Vermont Dairymen's Association, for the purpose of promoting, developing and encouraging the dairy interests of this State.

Sec. 2. The Auditor of accounts is hereby directed to draw an order on the State Treasurer in favor of the Treasurer of the Vermont Dairymen's Association, for the first payment of this appropriation on the first day of January, A. D., 1889, and annually thereafter so long as the conditions hereinafter provided shall be complied with.

Sec. 3. Said Vermont Dairymen's Association shall hold an annual meeting, continuing for at least three days, at some town or city in this State of easy access to the people, and in some comfortable and convenient building; and said meeting shall be open and free to the people of the State. At said meeting the best available talent in the country shall be employed to teach and discuss the best methods of dairy farming, and subjects connected therewith; and at the said annual meeting, premiums shall be offered for the best dairy products of butter and cheese, to an amount of at least two hundred dollars; such premiums to be awarded by disinterested and expert judges, and paid by the Treasurer of said Vermont Dairymen's Association.

Sec. 4. The Secretary of the Vermont Dairymen's Association, shall, on or before December 1, 1889, and annually thereafter, make a detailed and itemized account to the State Auditor of Accounts of the receipts and expenses of said Association, which accounts shall be approved and countersigned by the Treasurer and Auditor of said Association.

Sec. 5. If, in any year, it shall appear to the State Auditor of Accounts that any part of the preceding annual appropriation remains unexpended, or has not been honestly or judiciously expended, then such a part or amount shall be deducted from the order for the next succeeding annual appropriation.

Sec. 6. This act shall take effect from its passage.

Approved November 19, 1888.

An Act to Provide for the Printing of the Report of the Vermont Dairymen's Association.

It is hereby enacted by the General Assembly of the State of Vermont:

Section 1. Section two hundred and forty-seven of the Vermont Statutes shall be amended to read as follows:

The Secretary (of Board of Agriculture) shall prepare on or before the 30th day of June annually, a detailed report of the proceedings of the Board with such suggestions in regard to its duties and the advancement of the interests herein specified as may seem pertinent, and he may append thereto such abstracts of the proceedings of the several agricultural societies and farmers' clubs in the State as may be advisable and the report of the Vermont Dairymen's Association. The report shall show under separate heads the work of the Board relating to the different subjects herein mentioned.

Sec. 2. The provision of section two hundred and fifty-one of Vermont Statutes requiring the printing of a report by the Vermont Dairymen's Association is hereby repealed.

Approved November 4, 1896.

Constitution.

Section 1. This organization shall be called the "Vermont Dairymen's Association."

Sec. 2. Its object shall be to improve the dairy interests of Vermont, and all subsidiary interests.

Sec. 3. This Association shall consist of such persons as shall signify their desire to become members, and pay the sum of one dollar, and a like sum annually thereafter, and of honorary and corresponding members.

Sec. 4. The payment of five dollars shall constitute a life membership, or the payment of an annual membership fee of one dollar for five consecutive years shall constitute a life member.

Sec. 5. The officers of the Association shall be a President, two Vice-Presidents (one from each Congressional District), a Secretary, Treasurer and Auditor, who shall constitute the Executive Committee, and have the general oversight of all the affairs of the Association.

Sec. 6. There shall be held, during each winter, an Annual Meeting, at such time and place as the Executive Committee may designate, for addresses, discussions, exhibitions, and the election of officers, who shall hold their respective offices for one year, or until their successors are chosen. Said meeting shall continue in session at least three days.

Sec. 7. It shall be the duty of the Secretary to prepare an Annual Report of the transactions of the Association for the current year, embracing such papers, original or selected, as may be approved by the Executive Committee, and cause the same to be published and distributed to the Dairymen of the State of Vermont.

Sec. 8. The Treasurer shall keep the funds of the Association and disburse them on the order of the President or Vice-President, countersigned by the Secretary, and shall make a report of the receipts and expenditures to the Annual Meeting.

Sec. 9. This constitution may be amended at any Annual Meeting by two-thirds vote of all the members present.

OFFICERS

of the

Vermont Dairymen's Association.

1905

PRESIDENT.

H. C. BRUCE, - - - - - - Sharon

VICE-PRESIDENTS.

B. A. HATT - - - - - South Ryegate

GEO. TERRILL, - - - - - Morrisville

SECRETARY.

F. L. DAVIS, - - - - - North Pomfret

TREASURER.

M. A. ADAMS, - - - - - - Derby

AUDITOR.

C. F. SMITH, - - - - - - Morrisville

Mrs. Emma Grout-Nutt, Stenographer, Montpelier.

Rules for Dairymen Suggested by the Vermont Dairymen's Association.

The Stable.

1. Stables should be well ventilated, lighted and drained; should have tight floors, walls, and be plainly constructed.
 2. No musty or dirty litter, no strong smelling material, and no manure should remain in the stable longer than is absolutely necessary.
 3. Whitewash the stable once or twice a year. Would recommend using land plaster in manure gutters daily.
 4. Feed no dry, dusty fodders previous to milking. If dusty, sprinkle before it is fed.
 5. Keep stable and dairy room in cleanly condition.
-

The Cows.

1. Keep only healthy cows. Promptly remove suspected animals. In particular, add no cows to the herd unless it be certain that they are free from tuberculosis.
 2. Do not excite cows or expose them to stress of weather.
 3. Feed a good cow liberally with fresh, palatable feeding stuffs. Do not change these suddenly. Provide water, pure but not too cold, in abundance.
-

Milking.

1. The milker should be clean, and his clothes likewise.
2. Brush the udder just before milking and wipe with a clean cloth or sponge.
3. Milk quietly, quickly and thoroughly.
4. Throw away into the gutter the few first streams from each teat. This milk is very watery, of very little value, and is quite apt to injure the remainder of the milk.

5. Remove the milk promptly from the stable to a clean, dry room where the air is pure and sweet.

6. Drain the milk through a clean flannel cloth, or through two or three thicknesses of cheesecloth.

7. Aerate and cool the milk as soon as it is strained. The cooler it is the more souring is retarded. If covers are left off the cans cover with cloths or mosquito netting.

8. Never mix fresh, warm milk with that which has been cooled, nor close a can containing warm milk, nor allow it to freeze.

9. Under no circumstances should anything be added to milk to prevent it souring. Such doings violate the laws of both God and man. The chemicals which are used for this purpose are slow poisons. Cleanliness and cold are the only preservatives needed.

10. In hot weather jacket the cans with a clean, wet blanket or canvas when moved in a wagon.

Utensils.

1. Insist that the skim milk or whey tank at the factory be kept clean, in order that the milk cans may not become contaminated.

2. Wash all dairy utensils daily, thoroughly rinsing in boiling hot water and a little washing soda, scald and drain. Boil strainer cloths daily. After cleaning, keep utensils inverted in pure air, and sun if possible, until wanted for use.

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Life Members of the Vermont Dairymen's Association.

Adams, M. A.	Derby
Allen, Charles	East Berkshire
Armstrong, A. B.	Dorset
Allen, H. A.	West Milton
Allen, Henry	Pawlet
Adams, William H.	Keene, N. H.
Aseltine, M. L.	North Fairfax
Aldrich, E. O.	Shrewsbury
Adams, G. W.	Stowe
Akley, E. H.	Dummer
Aitken, George	Woodstock
Allen, G. A.	W. Brattleboro
Benedict, G. G.	Burlington
Blake, Geo. Boardman	156 Congress St., Boston, Mass.
Bronson, T. G.	East Hardwick
Bell, C. J.	East Hardwick
Barstow, J. L.	Burlington
Brownell, C. W.	Burlington
Briggs, Nelson	Brandon
Brigham, William O.	Bakersfield
Buck, Abner	Buck Hollow
Buck, A. N.	N. Ave., Burlington
Burt, William	Essex
Burt, Frank	Enosburg Falls
Ballard, B. M.	Fairfax
Blair, N. B.	Morrisville
Bliss, Abner	Georgia
Bliss, O. S.	Georgia
Beecher, H. A.	Hinesburg
Bates, A. E.	Huntington
Barnum, Ell.	Plainfield, R. F. D. 1
Bent, C. C.	Marshfield
Brown, J. S.	Plymouth
Bishop, D. B.	North Williston
Bond, John	E. Montpelier
Blood, W. O.	Norwich
Bass, E. L.	Randolph
Blake, William H.	Swanton
Bruce, H. C.	Sharon
Bell, F. C.	Swanton

Barry, Leonidas	Springfield
Brothers, H. F.	Hinesburg
Brackett, W. R.	.9 Chatham St., Boston
Bean, G. C.	Coventry
Belden, H. W.	Waitsfield
Bickford, F. H.	Bradford
Buxton, J. E.	Middletown Springs
Brock, L. F.	Barnet
Brainerd, E. P.	St. Albans
Bristol, R. T.	Vergennes
Bushnell, J. H.	Williston
Brownell, George W.	Williston
Barber, E. L.	North Williston
Bushnell, H. N.	Waitsfield
Butler, F. G.	Hartford, Conn.
Burrell, D. H.	Little Falls, N. Y.
Baker, J. W.	Syracuse, N. Y.
Brewer, J. R.	Hingham, Mass.
Burghan, W. H.	Montpelier
Beach, W. V.	Charlotte
Bent, Orrin	.57 Quincy Market, Boston, Mass.
Brown, B. B.	Williston
Cushman, G. L.	.75 S. Market St., Boston, Mass.
Carpenter, E. P.	West Waterford
Chaffee, J. H.	East Enosburg
Cilley, S. T.	Fairfax
Congdon, Edwin	Clarendon
Cannon, LeGrand B.	Burlington
Cahee, J. L.	Brandon
Cahee, L. J.	Brandon
Currier, P. W.	Montpelier
Clarke, M. S.	Clarendon
Coburn, J. A.	East Montpelier
Coburn, J. L.	East Montpelier
Campbell, H. W.	Holdridge, Neb.
Cutts, H. T.	Orwell
Colburn, H. E.	Rutland
Chapman, J. H.	West Rutland
Cowden, H.	St. Johnsbury
Colburn, R. M.	Springfield
Crampton, Charles A.	St. Albans
Currier, J. W.	North Troy
Curtis, J. K.	Georgia
Chapman, George A.	Williston
Cooley, William	Waterbury
Cobb, C. H.	Westford

Crane, George	Brookfield
Chase, C. P.	Proctorsville
Chandler, G. C.	Montpelier
Clafin, G. H.	St. Albans
Chase, Perry	E. Fairfield
Carpenter, O. G.	Cambridge
Clark, M. W.	North Williston
Colburn, H. W.	North Pomfret
Candon, J. B.	Pittsford
Choat, C. A.	W. Barnet
Cloverdale Creamery	N. Underhill
Dana, E. Y.	N. Pomfret
Donahue, J. F.	Vergennes
Doe, G. A.	Newbury
Douglass, O.	25 John St., Boston, Mass.
Dutton, F. B.	Woodstock
Davis, G. A.	Rutland
Donahue, W. F.	Ferrisburg
Donahue, T. E.	Hinesburg
Dodge, Harrison	Morrisville
Davis, George	East Montpelier
Donahue, D. G.	East Charlotte
Dwinell, L. G.	East Calais
Dwinell, Albert	East Calais
Davis, George F.	Cavendish
Dewey, Ed.	Montpelier
Dewey, Charles	Montpelier
Davis, C. H. E.	Healdville
Douglass, B. J.	Pittsford
Davis, F. L.	North Pomfret
Denio, W. B.	East Rupert
Douglass, W. B.	Williston
Dagon, M. R.	Madison, Wis.
Deal, T. M.	St. Albans
Eldred, H. S.	Sheldon
Evarts, A. D.	Bristol
Ellis, I. L.	Middlebury
Eaton, I. H.	Plainfield
Eddy, H.	Waterbury Center
Edson, E. A.	Chester
Eddy, C. F.	Stowe
Flint, J. P.	Montpelier
Fisher, L. C.	Cabot
Farrington, C. W.	West Danville
Fletcher, William	Essex Junction
Fassett, G. S.	Enosburg

Fassett, W. G.....	Enosburg
Fuller, C. C.	Jonesville
Fasset, A. B.....	East Berkshire
Field, D. L.....	West Milton
Forbes, D. A.....	Orwell
Frink, W. B.....	Swanton
Freeman, H. O.....	Sherburne, N. Y.
Gale, P. R.....	Stowe
Grout, L. D.....	Morrisville
Giddings, W. A.....	Bakersfield
Grout, Hon. J.....	Derby
Gibson, J. P.....	Mt. Holly
Gloyd, Jesse	Richmond
Gilman, A. A.	Randolph Center
Gleason, H. C.....	Shrewsbury
Goodspeed, Nelson.....	St. Albans
Graves, C. O.....	Waterbury
Gallup, J. A.....	W. Woodstock
Greene, G. F.....	S. Pomfret
Gates & Son, Chas... ..	N. Hartland
Gilson, Truman	Suncook, N. H.
Gale, J. E.....	Guilford
Hatt, B. A.....	South Ryegate
Hastings, S. J.....	Passumpsic
Harvey, Cloud	Barnet
Hibbard, C. A.....	Burlington
Hills, J. L., Prof.....	Burlington
Humphrey, A. O.....	Burlington
Hayward, G. M.....	E. Corinth
Heller & Merz Co.....	22 Cliff St., New York
Holden, Eli	Barre
Holliston, E. B.....	Manchester Center
Hotchkiss, C. A.....	Georgia
Hefflon, Franklin	Highgate Center
Haskins, Kittredge	Brattleboro
Hutchinson, William	Norwich
Hill, H. C.....	Isle LaMotte
E. C. Hillis	N. Montpelier
Howard, Ernest S.....	West Hartford
Hall, L. C.....	Westford
Herrick, A. A.....	West Milton
Hall, Charles	Montpelier
Head, George G.....	Montgomery
Harwood, J. W.....	Orwell
Hines, Ed.....	Pittsford
Hewitt, Stephen	North Pomfret

Higley, Nathan	Richmond
Hodgers, R. W.	Randolph Center
Hopkins, Daniel	Waterbury Center
Huse, S. R.	Waterbury Center
Hazen, C. D. Jr.	Wilder
Harwood, Burr	Dorset
Harris, S. L.	Proctor
Huntley, George M.	Westford
Healey, W. M.	Dudley, Mass.
Hopkins, Hermann, Jr.	Sheldon Junction
Hannum, P. C.	Weston
Harrington, W. H.	N. Pomfret
Hastings, C. A.	Springfield
Hayward, F. R.	Topsham
Isham, Ed.	St. George
Jackson, L. A.	Milton
Jackson, J. J.	Montpelier
Johnson, Arthur	East Ryegate
Johnson, A. B.	Malone, N. Y.
Jaynes, R. F.	Waterville, Me.
Kelley, G. A.	Marshfield
Kingsley, H. E.	Montgomery
Kinerson, J. R.	Peacham
Kidder, N. D.	Hastings, Neb.
King, M. D.	Woodstock
Kneeland, D. A.	Waitsfield
Kenfield, Frank	Morrisville
Leonard, H. B.	North Pomfret
Leonard, N. O.	Fairfax
Lord, W. H.	Mechanicsville
Lane, B.	Newport
Loveland, Aaron.	Norwich
Lyster, T. H.	St. Johnsbury
Lawrence, Henry	St. George
Lawless, C. C.	Montpelier
Le Page, Chas.	Barre
Loveland, J. H.	Norwich
Leary, J. A.	Jericho
Leonard, W. B.	Barton Landing
Lewis, M. J.	Woodstock
Monrad, J. H.	173 Chambers St., New York
Maynard, H. S.	Bakersfield
Mann, J. M.	Fairhaven
Marvin, Thomas	Montpelier
Moseley, F. W.	Clinton, Iowa
Miller, M. H.	Pomfret

Moore, A. A.....	Richford
Morse, D. H.....	Randolph
Maxham, G. R.	Woodstock
Macomber, D. H.	Essex Junction
McMahon, C. L.....	Stowe
Macomber, W. H.....	Westford
McLam, J. F.....	W. Topsham
Macomber, F. H.....	Shelburne
McNall, J. M.....	Milton
McGaffey, E. E.....	Lisbon, N. H.
Newton, C. H.....	Fargo, North Dakota
Nash, D. W.....	Beldens
Nay, Y. G.....	Jericho
Northrop, P. B. B.....	Sheldon
Newell, Bigelow	Stowe
Newton, A. J.	Wallingford
Oliver, J. C.....	Charleston
Parker, F. J.....	Grand Isle
Parker, J. B.	Whiting
Patten, J. P.....	Williston
Paine, C. S.	South Randolph
Page, C. S.	Hyde Park
Pierce, G. W.....	Brattleboro
Powers, William	Brandon
Peck, Cassius	Burlington
Pierce, C. C.....	East Clarendon
Place, R. H.....	Essex Junction
Peck, A. M.....	St. Johnsbury
Perkins, W. E.	Pomfret
Palmer, George	New Haven
Palmer, C. E.....	New Haven
Richardson, A. E.....	Burlington
Rie, Eli... ..	West Charleston
Robie, W. C.....	Franklin
Richmond, H. J.	Guilford Center
Roberts, D. W.....	North Pomfret
Reynolds, M. W.....	Middlesex
Robbins, Henry	Middlebury
Roberts, L. J.....	Waterbury
Ruggles, E. H.....	Westford
Rice, H. W.....	Brookside
Rutherford, W. L.....	Waddington, N. Y.
Ricker, N. H.....	Ryegate
State Dairy Bureau.....	State House Boston
Shackford, Mrs. C. J. Nelson.....	Ryegate
Stone, W. P.....	Strafford

Stafford, Charles	Chippenhock
Spear, V. I.	Randolph
Strong, P. W.	North Pomfret
Symms, E. E.	Ryegate
Slocum, A. R.	South Burlington
Stanhope, Spencer	Berkshire Center
Stevens, S. H.	Enosburg Falls
Snell, T. T.	North Enosburg
Stiles, G. M.	Morrisville
Standard Package Co.	Board Trade Block, Boston, Mass.
Stevens, Wm. Stanford.	St. Albans
Small, Fred M.	Morrisville
Stevens, N. C.	W. Glover
Sanderson, W. L.	Milton
Sanderson, C. P.	Milton
Smith, F. E.	Montpelier
Sowles, A. P.	St. Albans
Smead, C. D.	West Brookfield
Seeley, H. M.	Middlebury
Smith, C. F.	Morrisville
Spaulding, L. C.	Poultney
State Library	Concord, N. H.
Sherburne, A. E.	North Pomfret
Sherburne, J. C.	North Pomfret
Stoddard, M. A.	Rutland
Smith, N. E.	Richford
Smith, Francis	Swanton
Smith, F. V.	Stowe
Smith, George G.	St. Albans
Snow, F. M.	East Montpelier
Sowles, E. A.	St. Albans
Smith, E. C.	St. Albans
Sprague, N. T. Jr.	Brooklyn, N. Y.
Smith, E. A.	Boston, Mass.
Smith, F. B.	New York
Snow, Mrs. Edward.	Swansey, N. H.
Sprague, Geo. K.	E. Brookfield
Swan, P. B.	Montgomery
Storrs, A. A.	E. Bethel
Sherburne, E. C.	N. Pomfret
Scribner, D. C.	Charlotte
Towne, E. B.	Milton
Taylor, A.	Burlington
Turnbull, J. G.	Barton Landing
Tarbox, C.	Jericho
Towle, E. R.	Enosburg Falls

Thompson, Eben	North Danville
Teachout, S. D.	Essex Junction
Tarbell, E. S.	Montgomery
Terrill, G. H.	Morrisville
Tottingham, L. H.	Shoreham
Talcott, D. I.	Williston
Talcott, L. F.	Williston
Talcott, J. I.	Oakland, Cal.
Talcott, Frank	Williston
Tarwell, F.	Hampton, N. Y.
Terrill, M. W.	Middlefield, Conn.
Terrill, A. W.	Morrisville
Temple, G. H.	Randolph Center
Vail, H. W.	Randolph
Van Patten, W. J.	Burlington
Warren, S. H.	North Pomfret
Wells, Edward	Burlington
Ware, O. T.	Brattleboro
Wilcox, G. I.	Woodstock
Whitcher, J. R.	S. Ryegate
Williams, W. H.	Rutland
Wright, Will.	Brandon
Wheeler, N. B.	Brandon
Winslow, C. M.	Brandon
Washburn, Chat	Brandon
Williams, N. G.	Bellows Falls
Walker, N. S.	Clarendon Springs
Wright, Ellen J.	Colchester
Woodard, J. S.	Enosburg
Wheeler, Curtis	Fairfax
Weed, E. D.	Hinesburg
Warren, Rufus	Montpelier
Webb, W. W.	S. Royalton, R. F. D.
Wheelock, H. R.	Montpelier
Walker, Willard	Montpelier
Whitcher, H.	Newbury Center
Whipple, Obed Jr.	North Pomfret
Wheeler, F. H.	Proctorville
Walker, James	Springfield
Whitney, R. W.	Springfield
Warner, J. N.	St. Albans
Waller, M. D.	St. Albans Bay
Whitney, George W.	Williston
Whitney, Ed.	Minneapolis, Minn.
Wright, H. S.	North Williston
Willard, D. S.	N. Hartland

Wallace, Sidney	Waterbury Center
Weston, H. S.....	Winooski
Walker, H. W.....	South Woodstock
Williams, G. B.....	Walpole, N. H.
Williams, J. B.....	Glastonbury, Conn.
Webb, J. T.....	New Braintree, Mass.
Whitman, C. D.....	Fishers Island, N. Y.
Weston, S. H.....	Winooski
Warner, B. F.....	Burke

Note. If any of the members know of anyone on this list that is deceased or have changed their P. O. address, would confer a favor on your Secretary by notifying him of the same.

ANNUAL MEMBERS, 1905.

Albree, Geo.....	Concord, Mass.
Albee, C. S.....	Bellows Falls
Adams, Moses P.....	Lyman, N. H.
Blood, W. O.....	Norwich
Blake, Geo. Boardman.....	Boston, Mass.
Bond, John.....	E. Montpelier
Byington, C. M.....	Charlotte
Bancroft, Guy	E. Calais
Buell, S. B.....	S. Strafford
Blair, J. W.....	W. Barnet
Bailey, H. B.....	Coventry
Bigelow, N.....	Stowe
Bellows, F. A.....	Panton
Burbank, J. A.....	N. Pomfret
Briggs, Edgar	N. Pomfret
Burnett, R. E.....	Bethel
Burr, L. R.....	N. Clarendon, R. F. D. 1
Clifford, N. E.....	Essex Junction
Clifford, A. P.....	N. Pomfret
Cady, W. N.....	Middlebury
Carter, W. E.....	Rutland, R. F. D.
Cragin, L. M.....	Springfield
Cunningham, W. F.....	St. Albans
Carrigan, J. B.....	Pittsford
Campbell, J. G.....	N. Thetford
Chapin, Wm.	Middlesex
Cree, F. E.....	Plainfield
Croft, C. H.....	Arlington
Carpenter, H. H.....	Cabot

Cossingham, Jr., R.....	Norwich
Converse, Julius..	Middlesex
Calvin, Cleveland	W. Rutland, R. F. D. 2
Dodge, L. B.....	Barre
Darling, R. F.....	Newbury
Dana, E. Y.....	N. Pomfret
Draper, F. W.....	Enosburg Falls
Donahue, W. C.	Monkton
Eddy, C. F.....	Stowe
Elliott, W. H.....	Holden
Ellis, F. W.....	S. Corinth
Eddy, D. W.....	Monkton
Fassett, W. G.....	Enosburg
Fish, W. L.....	Bethel
Ferrin, B. W.....	Brandon, R. F. D. 1
Fuller, C. C.....	Jonesville
Gallagher, J. A.....	Craftsbury
Green, J. C.	S. Randolph
Gates, C. W.....	Franklin
Gordon, Edward	Grand Isle
Harris, S. L.....	Proctor
Hill, W. D.....	Montpelier
Hitchcock, Ernest	Pittsford
Harwood, Burr	Dorset
Higgings, L. M.....	Newfane
Hewitt, J. D.....	N. Pomfret
Hewitt, H. E.....	Bristol
Heath, W. E.....	Sharon
Hill, W. N.....	Starksboro
Howe, W. H.....	S. Royalton, R. F. D.
Howe, Ernest L.....	S. Royalton, R. F. D.
Hazen, C. D. Jr.....	Wilder
Holmes, F. E.....	E. Brookfield
Holonen, Miss Hanna.....	Wardsboro
Hayes, J. R.....	Strafford
Hillis, E. C.....	N. Montpelier
Hackett, D. H.....	Albany
Jewett & Son, S.....	Middlebury
Johnson, F. C.....	Tice
Jones, O. M.....	Warren
Jenne, A. M.....	Richford, R. F. D. 1
Jones, G. M.....	Waitsfield
Jones, E. H.....	Waitsfield
Leland, E. B.....	Perkinsville
Lewis, M. J.....	Woodstock
Lilley, J. D.....	N. Montpelier

Leonard, P. W.....	N. Pomfret
Leonard, W. B.....	Barton Landing
Leary, J. A.....	Jericho
Lackie, W. S.....	Marshfield
Lewis, A. L.....	Rochester
Messer, F. A.....	Greensboro
McDonough, P. H.....	Hinesburg
McNall, J. M.....	Milton
McGaffey, E. E.....	Lisbon, N. H.
Montgomery, F. W.....	Barre
Milligan, F. B.....	Walden
McNally, Alex.....	Milton
Mobus, G. W.	Warren
Martin, C. D.....	E. Corinth
Miller, W. W.....	Pomfret
Micott, M. R.....	Brattleboro
McIntosh, Mrs. Lisle D.....	S. Royalton
Newton, W. G.....	Colchester
Nelson, David	Cavendish
N. Y. Produce Review.....	173 Chamber St., New York
Perry, S. E.....	S. Pomfret
Page, L. B.....	Randolph Center
Parsons, W. L.....	Waitsfield
Palmer, C. E.....	New Haven
Palmer, Geo.....	New Haven
Pierce, J. H.....	Franklin
Roundy, C. C.....	Randolph
Ryan, D. E.....	Orwell
Ricker, N. H.....	Ryegate
Ridlan, M. H.....	Clarendon Springs
Seaver, Harold	Woodstock
Smith, L. M.....	Danville
Stone, F. G.....	Dorset
Small, Fred M.....	Morrisville
Seaver, L. W.....	Washington
Stimeto, J. J.....	Randolph
Sewall & Fowler	Royalton
Sawyer, A. G.....	Topsham
Simpson, J. W.....	Waterbury Center
Strong, G. W.....	Oakland
Slack, E. M.....	Woodstock
Stone, E. A.....	Brookfield
Sampson, O. D.....	Enosburg Falls
Teer, Frank.....	Clarendon Springs
Thatcher & Co., H. D.....	Potsdam, N. Y.
Vassau, J. N.....	Westminster

Warner, B. F.....	Burke
Wetmore, R. S.....	Pittsford
Whitelaw, F. R.....	Randolph
Wright, S. H.....	Stowe
Wells, Fay E.....	N. Randolph
Webb, W. W.....	S. Royalton, R. F. D.
Wescott, A. J.	W. Rutland, R. F. D. 2
Whitney, H. O.....	Williston
Winslow, H. L.....	N. Clarendon
Weeks, A. B.....	N. Clarendon, R. F. D. 1
Wheeler, W. H.....	S. Pomfret

VERMONT DAIRYMEN'S ASSOCIATION.

THIRTY-FIFTH ANNUAL MEETING.

The meeting was called to order at 1:30 P. M. Tuesday, January 10, by the President, H. C. Bruce of Sharon. An invocation was offered by the Rev. Guy C. Lamson, pastor of the First Baptist Church of Montpelier, after which President Bruce introduced Mayor F. M. Corry of Montpelier, who said:

"Mr. President, ladies and members of this Dairymen's Association and Sugar Makers' Association:

It is the mayor's duty always at the opening of an annual meeting of any association to give you a welcome. I represent the citizens of our city. Our citizens always welcome organizations that meet here, and especially organizations made up of farmers. A great many people have an idea that they can be a farmer and sit down and make a success. They cannot do it; a farmer has to have a great deal of push in order to make a success. Our State owes its success to the farmer! Years ago it was said that the farming business of our State was conducted by young men that came into Vermont; the farmer's sons went into trade. Our city would not be the large city it is today without the farming community. Every hill has a farm and every valley has a river and with the help of the farmers and the water that we have Vermont has been made one of the greatest States in the Union.

In looking upon this body of men today I can see men here that have grown rich and have grown old in farming. They have made a success. They started in with their hands and a small piece of land, and today they have large farms. A great many of the farmers have gone, their children have taken their places, they have improved, as the machinery right here in your room has improved, on the old. The young men have been educated and they have come back to the farms; a great many have settled down and a great many have come to stay.

In regard to the young men that have come here, we have them among our merchants, farmer's sons, and they are the most successful merchants we have. We have young men who have come here in our banks, our insurance companies and all

the business organizations that we have. They are the most successful business men that we have in our city today. Our city is being run by people who have been successful on the farms and have come here to educate their children. In our city offices we have an overseer of the poor and a water commissioner, both farmers' sons, who are some of the most successful men that we have here. All through the administration we have farmers and the farmers are a great help in running our city affairs.

Now, today, I wish to say to you that I, myself, came very near being a farmer. The first work I ever did was on a farm and the reason that I did not stay on the farm was that I could not make the stuff I planted grow. I made up my mind I could not be a successful farmer so I accepted a position in the store where I have been thirty-five years.

I heard some person say that this organization was thirty-five years old, so the Dairymen's Association and the business of the mayor of this city are of the same age.

I did not come here to make a long speech or to take up your time and I could not make a speech if I tried, but all I need to say is that you are welcome to this city and I hope your stay amongst us will be one of pleasure. Every door in this city today is open to you and any of you farmers who get left tonight at your hotel, I am sure of one door that will be open to you, and that is 26 Loomis street.

(Applause.)

President Bruce:—We will now listen to a response by Hon. V. I. Spear of Randolph.

V. I. Spear said:

Mr. Mayor, ladies and gentlemen:—It is a source of gratification always on entering a neighbor's home or entering any place to know that our coming there gives pleasure and to receive from our entertainer an expression of that welcome.

We have come to Montpelier so many times in the past for one thing and another and have always received that cordial greeting and that generous treatment that it is hardly necessary for anybody to say that any association in Vermont is welcome at its capital. We know it. At the same time it is fitting to say that we appreciate this feeling and this courtesy and this kindness that has always been manifested to the people of the State by the citizens of Montpelier.

The Vermont Dairymen's Association at its 35th meeting has a right to look back with some satisfaction and pride at the record it has made since its inception. Very few of those attending the meeting today can look back, I suppose, to its beginning, but we do know that for many years the dairymen of

Vermont struggled against great obstacles in keeping alive this association; that men who have now passed along and left us made great personal sacrifices and did a glorious work in helping organize the Vermont Dairymen's Association which, as I understand, and I do not suppose it is questioned, is the largest association of the kind in the world.

Now this Association can remember back in its history and can trace it through all the changes that have been rung in attempting to bring it up from the earliest primitive methods to what seems to us today the very perfect system that now obtains, and it is recognized and known that through the meetings of this Association, through its work from year to year, through the efforts that have been made that the dairymen of Vermont have been able to keep in the front rank of dairymen in this country, and I am firm in the belief that the excellence of the Vermont dairy product today is very largely due to the instruction and the information and to the impetus that has been given this industry through the meetings of this association. So, in behalf of the Association and of the dairy interests of the State I am glad to say that we are glad to come to our capital city to hold another meeting, believing fully that the knowledge we have got will be sufficient to carry us through another year and keep Vermont as it has been kept in the past, in the front rank of the dairy business of this country, both in the excellence of its product and in the abundance as well.

(Applause.)

President Bruce. We will now listen to the report of the Secretary.

F. L. Davis, Secretary, said:—Mr. President, ladies and gentlemen of the Vermont Dairymen's Association, the following shows the expense and financial standing of our Association:

Expended as follows:

W. D. Hoard, services as speaker.....	\$ 141 12
H. C. Adams, services as speaker.....	100 00
J. W. Decker, services as speaker.....	73 55
Orrin Bent, for scoring butter.....	35 00
G. L. Cushman, for scoring butter.....	35 00
Anna M. Dodge.....	27 00
Van Ness House.....	119 35
M. A. Adams.....	12 17
W. E. Perkins.....	18 20
W. H. Harrington.....	17 40
W. M. Adams.....	18 44
C. J. Bell, Secretary State Board Ag.....	25 00
Brown & Moore.....	33 03

Emma Grout Nutt.....	\$ 51 65
Free Press Association.....	97 10
M. A. Adams.....	9 19
F. L. Davis, Secy. as per bill.....	71 42
W. M. Adams.....	51 33
Brown & Moore.....	18 25
Economist Co.	110 00
F. L. Davis, salary as Secy.....	175 00
F. L. Davis, as per bill.....	23 10
M. A. Adams.....	3 55
Pd. as premiums 1904 meeting.....	241 92
Total expended.....	<u>\$1507 67</u>

Received as follows:

Cash on hand at settlement.....	\$ 46 85
Cash received for ads.....	467 24
Cash received for membership fees.....	181 00
Cash received, State appropriation.....	1000 00
Total receipts.....	<u>\$1695 09</u>

Leaving a balance of cash on hand..... \$178 29

Secretary Davis:—The report just read includes the secretary's and treasurer's report.

President Bruce:—You have heard the report of your secretary and treasurer, what will you do with it?

On motion, duly seconded, it was voted that the report of the secretary and treasurer be accepted and adopted.

President Bruce:—The next thing on the program is the President's address to which you will kindly give your attention:

PRESIDENT'S ADDRESS.

Members of the Vermont Dairymen's Association, Ladies and Gentlemen:—Year after year this Association has met, discussed, argued and learned: steadily making progress; broadening its aims and the thoughts of those who have attended the meetings: and through its members and printed reports helping and encouraging many dairymen and factorymen in their homes and places of business.

Now we have come to our 35th annual meeting; we have been heartily and cordially welcomed by His Honor the Mayor; great efforts have been made by those having the arrangements for the meeting in charge that all should be satisfactory: various kinds of machinery and utensils pertaining to our farm and dairy work have been placed here for the benefit and instruction of those in attendance upon this meeting. We have come here an-

ticipating much pleasure and benefit from these exhibits and from listening to the men who have trodden the way of the dairyman and factoryman somewhat in advance of the common rank and file; we have, also, looked forward to the pleasant handshake and the renewal of old acquaintances.

Now, whether we realize these anticipations or not depends upon you, dairymen, creamerymen, cheese makers, commission and supply house representatives, members and visitors, as well as upon your officers.

Then let us set the standard higher than ever before and make this meeting the most enthusiastic and practically helpful of any dairymen's meetings of which we have any record in this State or out.

Your executive committee after due deliberation and considerable discussion voted to try the rule in use by the "National Buttermakers Association" of awarding the premiums pro rata instead of the old method of first, second and third premiums.

It seems a step in advance and at least worthy of a trial—you know we are bidden "try all things and hold fast that which is good."

I need not tell you that the Association is large numerically for you are well aware of that fact. That it has some recognized power politically is demonstrated by the appropriation made by the Legislature of 1904 for the construction of an agricultural building, the need of which building was brought most vividly to our minds by the illustrated lecture of Prof. Hills, at Burlington, last winter. At that time a resolution was passed desiring that there be conveyed to the Legislature of 1904 the wish of the Association that a suitable appropriation be made for such a building. I am sure that the farmers and factorymen generally throughout the State extend most hearty thanks to all who were instrumental in helping to thus forward their interests.

While the Association is large and is developing considerable power politically in the State it seems to me that the greatest good that can be said of it is along the lines of education and co-operation. We are often hampered by our lack of training along our special lines of business and the most of it is that oftentimes, we do not realize that we need any special training. We keep in the ruts until perhaps, attending these meetings, we have brought forcibly to our minds that we must specialize somewhat, broaden our ideas and methods, or we shall most surely be left behind in these days of close competition.

I doubt not that many here in attendance upon this meeting have been awakened and benefited much. It has been and still is hard for farmers to co-operate, but this Association has been a potent means of help in overcoming the distrust which is

prevalent among them. Here we have learned that the interests of the farmer and factorymen are one and they can not be separated if we would attain to the greatest degree of success. The farmer needs educating along the line of factory work and the factoryman along the line of agricultural work, that each may see the work of the other from his own point of view.

To aid us in obtaining this education we have our Association, our Institute meetings, our Granges, the bulletins issued by our State and government and many books and papers, but with all this there seems to be a lack of systematic training and the thought has occurred to me, why not sometime, perhaps in the near future, organize a School of Correspondence or Farmers' Reading Course in connection with our Agricultural College. Such schools have already been successfully established in some of our sister states. Seemingly such a course would enable us to accomplish more in a given time and add to our interest in the work because we would feel that others were working with us.

Our agricultural fairs, when properly conducted, are educators. There, the people can bring into friendly competition the best of their herds and dairy products, can learn wherein they have failed or succeeded. A well conducted animal and dairy exhibit will not only provide instruction for the spectator but the lessons taught the exhibitor are almost equally important. Often, at large fairs, we come in contact with those who control the markets and an interchange of ideas is made possible, thus we obtain a better understanding of the market and its requirements. For instance, at Valley Fair, Brattleboro, one's herds and dairy products came in competition not only with those from Vermont, but from all New England as well, and men, expert in their line of business, judge of the qualities of the same.

Even if our products fall below those of someone else we can find profit from the ideas presented to us; we can gain inspiration and enthusiasm to better our herds and their products, thus, we will find our time and money well invested. Try it!

Nineteen hundred and four in some respects has been a little discouraging and considerable dissatisfaction has been felt or noted by all of us. At the beginning of the year the dairy market became unsettled and continued low and unsatisfactory generally, until about August. One of the primary causes of this seems to have been the passage of the Oleo or Grout bill. Unless you may think that I am not in favor of that bill let me say right here that I am; it has already been of great value to the dairyman, putting many thousands of dollars in his pocket, but after the passage of that bill as the price of dairy products advanced, many increased their herds and of course new dairymen appeared with the result of an unusually large production of butter during

the summer of 1903; this was put into storage at good prices. The continued large production of fresh butter brought it into direct competition with the storage butter and much of the latter had to be closed out at less than buying price—this tended to an unsettled state of affairs.

The butter for storage this summer was put in at a low price and the output began to decrease accordingly. About August we began to get onto firm footing again. Now, at the beginning of 1905, the outlook for the year is quite favorable.

Thus you will see that the depression of the butter and cheese markets was from perfectly natural causes which have somewhat righted themselves already.

While we have noted that which has been discouraging, let us not fail to remember that 1904 has been noted for its abundant harvests, its fairly remunerative returns for the same and for the increased recognition accorded the farmer as an important factor in the world's progress. There is a movement started to have the tax on oleomargarine, colored to imitate butter, reduced from ten cents to four or five cents per pound, the claim being that the present tax is practically killing the business. It is claimed that a reduction of the tax would increase the revenue and that Uncle Sam needs the money. It has been reported that Secretary Wilson will not approve any measure looking towards the repeal or change of the present law. It is also a fact that the commissioner of internal revenue makes no recommendation that the tax be reduced on oleomargarine; he simply shows that the present tax is not a great revenue producer and that raising revenue is not its object.

The dairy interests are watching this movement and if we properly assert ourselves there is but little fear of a change in the present law. Perhaps it would be well for this Association by resolution or otherwise, to petition our congressmen, requesting that the present law be retained.

The labor question, for some of us, is developing into quite a serious problem. Satisfactory help at reasonable prices seems to be almost a thing of the past; much is said and written about it but still the matter does not mend. It seems, sometimes, as if the more we did to make the work pleasant, easy and interesting to those who help us, the less they were satisfied. Village and city life have more attraction for them.

I suppose they are like the poor half-starved city woman whom some one thought to benefit by securing a good comfortable place in which to work in the country. A short time passed and she was again found back in the city, suffering for the necessities of life. When asked if she wasn't treated well, fed well, etc., she replied, "Yes." "Well then why didn't you

stay there?" "Shure sor, folkes be more sociable loike than stones."

I suppose that is one reason why so many of our young people leave us—lack of social life. Still another reason is that they have not been trained toward agriculture in its varied forms; they have not been taught to honor it as the most healthful, useful and noble employment of man.

These things can and will be remedied; people are beginning to realize that not only is agriculture necessary but it is interesting; it requires a mind broad and deep to grasp it in all its complexity; then, when the work is taken up along special lines, we find that it is a science worthy our best efforts.

Now just a word more in regard to our Association. Many of the older members who have helped to make this organization what it is, who struggled along under difficulties, few in numbers, and at first without a State appropriation, have passed or are passing from the ranks of workers and we have entered into their labors. If this Association is to continue and grow in usefulness the younger men must do their part, they must work earnestly and harmoniously, keeping ever before them high ideals of citizenship, education and of all things tending to the uplifting of the people.

President Bruce:—The next number on our program is "Some Creamery Troubles" by J. F. Cowern of Charlotte.

Secretary Davis:—In the early part of last summer I wrote Mr. Cowern for a paper on creamery work, he consented to write one and took for his subject "Some Creamery Troubles." In September or October he decided to give up creamery life and is studying law, but he wrote his paper and sent it to me. I am sorry Mr. Cowern is not here to read the address, which I will present to you as well as I can:

SOME CREAMERY TROUBLES.

By J. F. COWERN OF CHARLOTTE, VT.

Mr. President, Members of the Vermont Dairymen's Association, Ladies and Gentlemen:—It gives me great pleasure to be with you today and I consider it a great honor to be asked to address such a large and influential organization as is the Vermont Dairymen's Association—and right here let me say that I believe that the secret of its growth, its great influence and the continuing interest that is manifested in the ideas and purposes for which it stands is due very largely to the wisdom that its members have shown in selecting their officers.

The organization in the eyes of the people is judged very largely by its officers and it depends almost entirely on their effort and the interest they take in the work as to whether or

not your annual meetings are to be successful. That they have been successful in the past I have been a living witness—that they will continue so in the future my unbounded faith in its present leaders and rank and file will not permit me to doubt. When your secretary, Mr. Davis, wrote to me early last summer and asked me to prepare a paper for this convention he suggested that I take for a subject the importance, the in fact, absolute necessity for the exercise of greater care and cleanliness in the production of milk.

It is a big subject, one that has been handled many times by men better fitted to deal with it than myself and in what I say here today I shall merely emphasize what has been said many times before and which, I am sorry to say, I feel convinced will need to be reiterated many, many times in the years to come.

It is, moreover, a subject that is difficult to handle without treading on a great many toes, and it is also a subject that has more aspects than one and I shall first deal briefly with the subject as it affects the men in the creameries.

They are all discussing it and outlining different plans for bringing it about. Pick up any of the creamery papers and you will find a large part of their space taken up in dealing with this problem. How can we induce, or force, it doesn't matter which, our patrons to take better care of their milk?

How can we get them to approach, however slowly, a sanitary standard? Some of them apparently spend so much time in deep thought on this point that they entirely overlook the necessity of realizing themselves,—at least a fairly decent sanitary standard.

The creamery man who has several large beams in his own eye is rather handicapped when he attempts to remove the mote out of his patron's eyes, and whatever he may say about the necessity for greater cleanliness in handling milk while in *their* possession, will largely lose its force when they see every day the unsanitary condition in which it is handled while in *his* possession. Floors that seldom get a thorough scrubbing, dirty vats, churns, implements and separators and skim-milk tanks that are, to use rather an inelegant expression, fairly rotten, do not impress the farmer with the necessity for cleanliness in producing milk.

So I say that the first step necessary in the solution of this problem is cleanliness on the part of the creamery man himself. Until he takes this step he will not be heard to insist that the patrons must take better care of their milk and produce it under more sanitary conditions.

After taking this step, as many of them have done, he is in a position to demand that the farmers supplying him with

milk shall exercise ordinary care and ordinary cleanliness. We now reach the farmer, and I will briefly enumerate a few of the more serious reasons for complaint, of one or more of which most of them are guilty while some are guilty of all that I shall mention, and more too.

1. Very few of the barns are provided with any means for ventilation and consequently the air is impure, especially during the cold winter months.

2. The cow's quarters are not kept clean—or, at least, not as clean as they should be.

3. During the winter months when the cows of necessity must be kept in the barn, many farmers pay little attention to keeping them clean, which results in a condition of affairs better imagined than expressed in words.

4. The manure is often piled in such places and in such quantities that the inevitable result is the contamination of the air in the cow's quarters.

5. The barn yards are often quaking quagmires that cannot be crossed unless one wears high rubber boots or is on a raft. The cows in order to get to water or to pasture must wallow through this.

6. Oftentimes the only water accessible to the cattle in pasture is stagnant pools.

7. No facilities for properly cooling the milk.

8. Milk not properly strained.

9. Cans, strainers, milk pails, etc., not properly washed.

10. In the winter time many farmers put the milk back of the cows to keep it from freezing—this practice should be made a crime punishable with death.

11. A great many milkers milk with wet hands. If the hands or the cows' teats are dirty, as is usually the case, the combination is a delightful one when taken into consideration with the fact that milk is a food.

12. The covers are often put on the cans before the milk is cool, resulting in a smothered smell and taste that is very disagreeable.

13. The milk cans are not covered while being hauled to the creamery. In muddy weather this often results in the cans getting covered with mud, in hot weather it results in the milk warming up with the consequent multiplication of bacterial life, while in cold weather it results in the freezing of the milk.

14. During the winter months a great many farmers think that the milk requires little or no care and act accordingly, delivering it perhaps twice a week.

I sincerely hope that every farmer present here today can

conscientiously say "Not guilty" to every count in this indictment but at the same time I am sure that you will admit perhaps that most of your neighbors would be found guilty on at least a few of these counts.

To be sure there have been great improvements in creamery apparatus and methods within the last few years and with the aid of clarifiers, pasteurizers and commercial starters the creamery man is able to turn out a fair product even when battling against a discouraging indifference on the part of the patrons. But improved methods and apparatus in the creamery have not done away with the necessity for cleanliness on the part of the patrons. It is as essential now as it ever was that milk should be produced under sanitary conditions. Milk is one of the chief articles of food, especially for the young, and hundreds of disease epidemics have been traced directly to the milk supply.

When the public health is so vitally concerned surely it is not officious intermeddling with private business to insist upon the observance of reasonable precautions that have for their purpose the prevention of contamination.

But the requirements must be reasonable, the ordinary farmer cannot be expected to realize the standard set by such a firm as the Deerfoot Company of Southboro, Mass., for instance, where the barn is a sanitary model, the cows carefully cleaned each day, the manure removed to a distance.

Where the milkers wash themselves thoroughly, put on clean white overalls and jumpers and carefully clean the cow's flank and udder before milking. Where the milk as soon as drawn from the cow is taken to a separate compartment where it is immediately taken care of according to the most approved sanitary methods. To require this of the ordinary farmer would be unreasonable.

It would put him out of the dairy business for it requires considerable capital and in order to make it pay prices considerably above the average must be secured.

But it is not asking too much to require that the cow stable be kept clean and ventilated, that the manure be disposed of in such a manner as to avoid contamination of the air in and around the cow stable, that the cows' bodies be kept clean and that they be supplied with an abundance of pure water, that the milk be properly strained and cooled and kept where it will be free from contamination until delivered to the creamery.

It requires but a few moments for the milker to wash his hands, brush the dust from his overalls and from the flank and udder of the cow before milking, but it results in a wonderful improvement in the quality of the milk. And yet how few there are who take these few simple precautions!

I think that when these precautions are taken the farmer

is amply repaid for the extra time and trouble by the increased price of his products. Customers are demanding a high grade of excellence in butter and cream and this cannot be secured unless the milk from which it is made is produced under sanitary conditions.

The public generally is awakening to a realization of the importance of a pure milk supply. When they investigate its source as they surely will, I trust and hope that the investigation will find the farmers of the Green Mountain State with nothing of which they will be ashamed.

Secretary Davis:—This is a paper on which we ought to have a lively discussion and I regret Mr. Cowern is not here to be questioned but I think we can get up questions among ourselves and discuss this paper for a short time.

Just to start the ball rolling I want to suggest an idea that all of the farmers and patrons of the creamery could easily carry out and which I think would be one of the greatest benefits and helps to creamery men, and that is to cool the milk or cream, especially with the cream gathering system. The expense is slight. A small cooler filled with cold water or a little ice in the summer time (I had one made at my own expense which cost \$1.50 and served the purpose for two years) will take the animal heat from the milk and bring it down to a temperature of about 50 or 55, and the keeping qualities of the cream will be much better. I think all buttermakers will approve of this method.

President Bruce:—We have a few minutes for discussion of this paper which I hope will be improved.

C. F. Edly of Stowe:—Mr. President ladies and gentlemen: This is indeed a great question. It is a question that touches the pocket books of every farmer in the State of Vermont. It is a question, sir, that should come home to every farmer who is taking proper care of his milk and cream. A good many of us have a mistaken idea of the creamery men, that they can make good butter out of almost any kind of old stuff, but sir, it is not a fact as you all very well know.

Now the idea that the secretary, Mr. Davis, suggested, in regard to the cream cooler is a very good one. It can be made at a very little expense and cost very little, and when you come to get your returns from the factory it will make quite a difference in your income. In cream at 60 degrees fahrenheit the bacteria will multiply about 30,000 times per hour, at 45 only 20,000 and at 30 about 60,000. Probably there are a good many of us who do not understand that the cooler we keep our cream, the better condition we can get it to the creamery in, the better price you can get for your butter.

E. R. Towle:—Brothers, this is a very important question. I am a farmer; brought up on a farm where my father commenced years ago and I have always been engaged more or less in the keeping of cows. My son is following after me and my grandson is coming in behind. I hope the old farm will be kept in the family for some time yet. We are trying, have always been trying to make good clean milk and to make the best quality of butter and cheese from that quality of milk. Not long ago I heard a man say he could not use the milk his farmer brought from the farm. What the trouble was I don't know, but the milk was so poor he said he could not use it. I remember carrying some butter one winter to a dealer and he said, "Your butter does not have a stable flavor to it." Well, I thought that was a pretty good compliment. It was in the winter when it needs the greatest care to get good, pure, clean milk. I furnished the butter to the neighbors or people in the village that wanted it. There was no fault found with it, although it was made in the winter. Every farmer should have time in the winter to take care of his cows; it will pay to keep them clean. You can have good air but it is necessary they should be warm enough; and the bedding—that is another very important part. My son beds his cows twice a day, morning and night, and I find no trouble when I milk in having the milk as clean as it is in the summer, and the cows look much better if they are kept clean. I can remember when the opposite was altogether the rule, and if you went in behind a row of cows they did not look attractive. Now I like to see cows look well, and we must keep them clean and looking well if we are going to have good milk, and we must have good milk if we are going to carry it to the cheese or butter factory. That is the starting place to get good butter, for good people who buy milk want good milk, and if they buy butter or cheese they want to have it right and they are willing to pay for it.

If we are going to make butter at home on the farm we want to attend to all the details and it should begin with the milk. We hope the farmers will be interested in the discussion of these things because they are all of great value to us.

Brother farmers, I am glad to see so many of you here at the first session of the meeting; it argues well for the success of the following meetings, and I hope as the sessions go by each one will grow in interest, and we shall carry home with us some ideas that will put forth fruit during the coming year. There is something here well worth our attention. Let us try to put the new ideas into practice for that is what is going to help.

A member:—I should like to ask one question, and that is, what good is there if we should be ever so neat and careful with

our milk and cream when we get ready to carry it to the creamery if our neighbors are clear the other way and pay no, or but little, attention to the cleanliness of their cream or milk?

Secretary Davis:—Perhaps yours might be a lesson for the other fellow to follow. Let us look at our farmers, suppose one man in a neighborhood has an idea that he wants to fix up his door yard, cut out a road, and keep the grass in the yard well mown. Within five years every man in that neighborhood will try to get his door yard fixed up a little better than his neighbor.

If each one of us will cool our cream and take pains with our cows it will have a tendency to improve the whole neighborhood. The product of my dairy goes into cream and it is cooled. I send about 200 quarts of cream per week. Once in a while I do not have enough and I buy some that is not run over the cooler and if it is kept three or four days after it arrives in Concord I will have a letter from the dealer saying, "you did not cool your cream properly, Mr. Davis."

Mr. Towle:—Is your cream sent to the cities, Mr. Davis?

Secretary Davis:—Yes, sir.

A member:—Mr. President, I want to ask you if you think it is as necessary to cool the milk when carried to the creamery as it is the cream. Whether milk that is taken to the creamery once a day should be run over a cooler or through an aerater? I know over in Canada—they are most all cheesemakers over there and in lots of those creameries or cheese factories they will not accept milk that has not been aerated. They say they cannot make good cheese without it. Is it as necessary in making butter? If it is we should all try to aim in that direction, but I have been wondering if an aerater is necessary. They are made something like a pail turned bottom up, the milk is turned in at the top and it comes out in little fine streams at the sides.

A member:—As a buttermaker it has been my experience and my belief that more bad odors and bad flavors get into milk and cream through being insufficiently cooled in the beginning, than in any other way.

President Bruce:—If I may be allowed to say a word: I do not believe there is anything you can do that will add to the value of your product more than cooling your milk as soon as it is drawn, whether you carry it to the creamery or separate it at home. Cool your milk as soon as it is separated, it is a fact it will add to the value of your product every time, whether you make the butter at home or send it away, cool it down to 50 or perhaps 45, not cooler than 45.

Secretary Davis:—Don't you think it is just as necessary in the winter as in the summer?

President Bruce:—Just as necessary.

A member:—One question I want to ask this Association. I had an experience last summer that I have never had before in fifteen years: During the summer I had two lots of nice milk thicken before I went to the creamery in the morning, and to my wife's and my taste it had not changed a mite in sourness, but you could dip your hand into it and take it up and it would lie upon your hand and quiver like jelly. Can you explain it?

President Bruce:—I cannot, I will call upon Mr. Eddy.

Mr. Eddy:—I am not an encyclopedia and I never have seen anything of that sort so I cannot answer the question.

Mr. Ruddick:—That is quite a common thing, the spontaneous curdling of milk, which is a species of fermentation different from that that causes the souring of milk. It is due to the action of certain germs in the milk. I have seen this occur on various occasions. Sometimes it has become in some parts of our country rather a serious trouble because the milk is practically useless for butter or cheese making. The only thing to do when that kind of disease (because it is a disease) breaks out in your dairy is to take especial pains to remove or trace the infection by the most thorough and systematic disinfection of the whole surroundings. Sometimes the germs are from the creamery or cheese factory in the way the skim milk is turned into the cans and it has proven at times a rather difficult thing to handle; sometimes have to clean the whole premises, and sometimes the premises of the neighbors or of the factory, if it is infected, to get rid of the fermentation. It is a fermentation the same as souring is, only differs in different fermentation.

Secretary Davis:—If it had been aerated would it have made any difference?

Prof. Ruddick:—Anything that is liable to check the fermentation.

A member:—I wish to thank the gentleman for his explanation. I have known one other instance of its acting in that way. I had seen a good many of my neighbors bringing thick milk home from the factory, but when I had to leave it at home before I started I thought something had happened.

Prof. Ruddick:—Your thorough cleaning probably did not remove the source of the infection. It might have come from the surroundings. We think a good suggestion would be to move the cans and milk vessels to some other place for the time being because there is a danger that the milk is being infected by some of the surroundings. I do not think that the electrical storm had anything to do with the occurrence, as a matter of fact the electric current is used in certain ways to destroy fermentation and to sterilize the milk. We all know that when there is a thunder storm that the milk usually does sour

more quickly but it is the climatic conditions, not the thunder storm that does it. Just before the coming of a thunder storm we generally have a condition of the atmosphere that causes the souring of the milk.

President Bruce:—We have a man with us from another country. He lives not very far from Vermont, but he is a resident of Canada. He has come here this afternoon to speak to you upon the subject of the "Cool Curing of Cheese."
J. A. Ruddick, Dairy Commissioner, Ottawa, Canada.

Mr. President, ladies and gentlemen:—I have always had a great deal of pleasure in attending dairy meetings in the United States, but I assure you it is a special pleasure to me when I receive an invitation to speak before a joint meeting of the sugarmakers and the dairymen of the Green Mountain State. I have several reasons for being glad of this opportunity. In the first place I am always glad to be able to do my share in reciprocity for the many good things which we have had as dairymen from the United States in times past. I can remember when there was not very much reciprocity to it, when we were receiving all and giving none, because as far back as I can remember anything about the dairy business I remember of such men as Leander Witherill of Boston, Prof. Willard, then in late years we have had Governor H. W. Hoard of Wisconsin, and last, but not least, your own Prof. Hills of Vermont came over last year. We are always glad when we have an opportunity to come to this State and return some of the kindnesses that have been shown us.

I have other reasons for feeling somewhat at home in your country, which is very similar to what we call our eastern townships of the Province of Quebec lying south of Montreal. Then I have a personal reason because I want to tell you that some twenty years ago, when I thought it was time to take unto myself a wife, I crossed the American line into Northern New York and found a young lady who is very proud to claim that she is descended from good old Vermont stock. So you see the better half of me is a Vermonter and I have a very good reason to feel at home in coming here, and so far I have not been disappointed in that respect.

I think your problems are our problems; we have our difficulties and I suppose you have yours. Of course cheese is king with us. We manufacture a great deal more cheese than we do butter and the greater part of our cheese is made for export to Great Britain, but after all the same principle applies whether we are making cheese for British consumption or whether we are making it for American consumption. There is

not so very much difference in the character of the cheese that is made. I am fairly familiar with the character of United States cheese, not only here but further west, New York State, Ohio and Wisconsin. Cheese has come to the front in all the great dairying states.

I am here to talk to you a short time this afternoon on:

THE COOL CURING OF CHEESE.

BY J. A. RUDDICK,

Dairy Commissioner, Ottawa, Canada.

There is probably no phase of dairying in America to-day which is receiving more attention than the question of the cool curing of cheese and all it involves. As the Dairy Division at Ottawa has had some considerable share in awakening this interest it would seem to be desirable that a fairly complete statement should be submitted as to the means which have been employed with that end in view.

Our work has been almost entirely along commercial lines as distinguished from those of scientific research. In saying that I do not wish to be understood as underestimating the value of the work of the scientist; the two lines of work are necessarily different. The scientific worker must seek the truth wherever he can find it, and cannot be influenced by considerations of expediency or practicability, but those who would apply these truths in commercial undertakings must ever be guided by such practical questions as expense on the one hand and possible gain on the other. Thus when we come to the study of the influence of temperature in the ripening or curing of cheese, we find that there are two sides to the question. The scientific investigator must determine the best possible temperature regardless of time, cost, or any other consideration, but commercial exigencies will decide how far the investigator may be followed by those who are trying to make a living out of the cheese business.

Now we hear of cheese having been cured with good results at a temperature as low as 40 degrees, and even much lower than that for experimental purposes. It is claimed, not without reason I believe, that some of the cheese cured at this low temperature have turned out better than others which have cured at moderately low temperatures ranging between 50 and 60 degrees. The improvement appears to be the most noticeable in cheese made from tainted milk and which develop bad flavors at ordinary temperatures. I doubt very much, however, if as low a temperature as 40 degrees will ever be adopted

to any extent for curing Cheddar cheese, because of the following objections:

1. To maintain such a low temperature in a curing room would involve heavy expense for insulation and refrigeration.

2. The curing or ripening would be retarded so much that the cheese would not be fit to place on the market for several months.

3. There is more or less danger of cheese which are cured at extremely low temperatures showing "soft rinds" after a few week's storage.

If there is such a thing as a standard of quality for Canadian or American cheese it certainly is in our autumn makes, because "September" quality is generally admitted to be the highest point of excellence attained. It is of importance to remember that the mean temperature in the cheesemaking districts for the month of September ranges from about 58 to 62 degrees. Now, if we can cure our summer cheese under September conditions there is no reason why we should not produce "September" quality throughout the whole season. You never hear of New Zealand cheese being classified according to month of manufacture, because the climatic conditions do not vary in that country throughout the cheesemaking season. It is for us to consider then if these standards, the value of which we know, are as good or better for us to aim at than something else which has not yet been proved in a commercial way. After weighing all the evidence so far obtainable, I am of the opinion that a temperature of 55 to 60 degrees is the best one to recommend for general adoption.

When the central cool curing rooms established by the Canadian Government were built they were designed for maintaining a temperature of 55 to 60 degrees, and they have proved to be very satisfactory for such a requirement. Incidentally we have come to this conclusion, that it is easier to maintain a steady uniform temperature at any point between 55 and 60 degrees than it is at any other point, either higher or lower. The reason for this is that we are able to take advantage of the cooling power of the earth, through the cement floor, which has a constant temperature of about 56 degrees, and being a fairly good conductor of heat acts as a regulator when other conditions tend to either raise or lower the temperature.

Having said this much in favor of "cool" curing as opposed to "cold" curing, I wish now to give you briefly some of the results and advantages of cool curing, with special reference to the operations of the central cool curing rooms just referred to. I shall not weary you with the details of the construction of the buildings. Full information on that point is contained in a

bulletin which I shall be glad to send to anyone who applies for it. A complete report on the cool curing rooms will be found in the Report of the Commissioner of Agriculture and Dairying now in course of preparation.

COOL CURING ROOMS.

These curing rooms have now been in operation for three seasons and a total of 119,832 boxes of cheese, from 70 different factories, have been cured in them since they were started. This means that a large number of dairymen have had a direct interest in the results obtained, and the quantity of cheese has been sufficient to attract considerable attention from the trade, and to make a quotable feature of the markets. "Cool Cured" cheese are now frequently mentioned in market reports as a distinct class or grade for which the highest price is paid.

THE SAVING OF SHRINKAGE.

As the cheese were collected from the factories, two cheese from the same vat from all the factories were set aside each week, and after being carefully weighed to 2 ounces, one was placed in the curing room and a mate to it was put in a room in the upper story, where the temperature was not controlled, and was comparable to an ordinary curing room. The temperature in this room, by accurate comparison, was never higher than in any of the cheese factory curing rooms. On the other hand, the "test room" was frequently found to be cooler than the factories. I mention this because I want to show that the test is a perfectly fair one. When the cheese of the corresponding week were sold, these test cheese were again weighed, and the difference in shrinkage noted. From this difference the saving in shrinkage on the whole shipment was easily calculated. Table 1 gives the actual saving in shrinkage on all the cheese received, and the value of this saving at the selling price of the cheese. The value given is the amount collected from the factories.

TABLE I.

Curing Room	Pounds Cheese Received	Percentage Shrinkage Saved	Pounds Shrinkage Saved	Value Shrinkage Saved
1902				
Woodstock	906,560	1.58	14,327	\$1,424.13
Brockville	526,950	1.52	8,054	814.48
Cowansville	494,296	1.34	6,640	662.02
St. Hyacinthe . .	143,190	1.66	2,386	238.41
Totals	2,070,996	1.51	31,407	3,130.04
1903				
Woodstock	1,128,442	1.40	15,823	1,604.49
Brockville	761,599	1.27	9,689	1,011.39
Cowansville	1,137,159	1.20	13,694	1,497.44
St. Hyacinthe . .	711,076	0.95	6,816	699.76
Totals	3,738,276	1.23	46,022	4,813.08
1904				
Woodstock	1,007,245	1.28	12,915	1,164.55
Brockville	790,773	1.26	9,997	834.47
Cowansville	994,604	1.50	15,002	1,216.75
St. Hyacinthe . .	934,376	1.38	12,952	1,019.90
Totals	3,726,998	1.36	50,866	4,325.67

CONDITIONS WHICH AFFECT THE SHRINKAGE.

There are three conditions which influence the rate of shrinkage in a curing room, (1) the temperature of the air, (2) the relative humidity of the air, and (3) the percentage of moisture in the cheese. The size of the cheese and the length of time the cheese remains in the curing room are also important factors in determining the amount of the shrinkage. The temperature in the cool curing rooms did not vary more than 2 degrees from day to day, and ranged from 55 to 59 degrees for the three seasons. The relative humidity was also a nearly constant quantity, averaging about 90 per cent., and varying from 88 to 94. The moisture in the cheese varied considerably, and we found some difficulty in persuading a number of the makers to make their cheese dry enough, because cheese for cool curing should be made quite as firm as for ordinary curing. On the other hand, both the temperature and the relative humidity in the room where there was no control of temperature, which we call the "testing room," varied from day to day and from month to month according to the weather.

The highest temperature recorded in the testing room was 85 degrees, and during September last it reached as low as 45 degrees or fully ten degrees lower than the curing room proper. The relative humidity in the "testing room" varied from 70 to 88.

It will be easily understood, therefore, that percentage of shrinkage saved, from week to week and on the cheese from different factories, shows wide departures from the averages given in the table.

Table 2 is a typical example of an individual record when the weather was fairly warm and dry.

TABLE II.

Relative Shrinkage of Two Cheese made from the Same Milk and Cured at Different Temperatures, (Unparaffined.)

Curing Temperature	60-80 degrees		58 degrees	
	Lbs.	Oz.	Lbs.	Oz.
Green Weight, July 8th.....	85	1	84	9
Weight, July 21st	83	12	84	4
Weight, August 26th	82	0	83	8
	—	—	—	—
Loss in weight	3	1	1	1

The average saving of shrinkage for the three seasons has been 1.34 per cent. or over 1 lb. on an 80-lb. cheese. The actual value of the shrinkage saved, as based on the selling price of the cheese, was \$12,178.39 for the three seasons. It should be stated in this connection that during the first season, (1902), the cheese were paraffined after the first month on the day they were received. Under these conditions the paraffining had considerable influence on the shrinkage. During the past two seasons the paraffining was not done until the cheese had been in the curing room 10 days or two weeks, and therefore had very little effect on the shrinkage.

COOL CURED CHEESE SELL AT HIGHER PRICES.

That there is an improvement in the quality of cool cured cheese as compared with those which are ordinary cured in hot weather is now generally admitted. Interest in this point leads to the question as to how much the actual commercial value is increased by the improvement. During the past season a large proportion of the cheese from the cool curing room has been sold for $\frac{1}{8}$ to $\frac{1}{4}$ of a cent a pound more than the highest price paid for ordinary cured cheese from the same district. The make of one factory was contracted for at $\frac{1}{4}$ of a cent advance on condition that the cheese were sent to the cool curing room

at Brockville. Another important consideration is this, that many of the lots of cool cured cheese which passed as "finest" would certainly have been "rejected" if they had been ordinarily cured, with the cut in price usual in such cases.

Several consignments of cheese from the cool curing rooms, consisting of mates, one cool cured and the other not, were sent to Great Britain last season. Andrew Clement & Sons, Glasgow, who received one shipment from the Cowansville curing room, disposed of the cool cured cheese in one lot and the ordinary cured ones in another, and got 2 shillings per cwt., (practically $\frac{1}{2}$ a cent a pound), more for those that were cool cured. The same result followed a shipment to W. P. Sinclair & Co., from the Woodstock curing room, sent through their representative, Mr. T. B. Millar, London, Ont. The following are extracts from some of the letters received in this connection:

From A. Clement & Sons, Glasgow, Sept. 17th, 1904:

"We are in receipt of yours of August 30th, and have received the Cowansville cool cured cheese and shown them to the trade. We have had quite a lot of criticism on them and are pleased to report that it is all satisfactory, and the opinion is expressed that cool curing will do more for the Canadian dairy-ing industry than any movement that has taken place during the last ten years. However, by next week I hope to send you a full report for official purposes."

From W. P. Sinclair & Co., Liverpool, Oct. 8, '04:
Mr. T. B. Millar,
London, Ont.

Dear Sir:—

"You will notice we have made a higher price of the cool curing room cheese than for the ordinary cured; also the detailed weights of the cool cured cheese are much more satisfactory than the ordinary cured cheese.

"With reference to the keeping qualities of the cheese, there is no doubt in our minds as to which process is the best. We would far rather have cheese cured on the system advocated by the Government than the ordinary method now in use at the factories; not only is the weight preserved and the condition better, but the flavor is very much more satisfactory; this is the general consensus of opinion of all the people in the trade who have inspected the cheese in our warehouse.

"We trust the Government will be able to convince the factorymen as to the necessity of erecting cooling rooms answering to the description of those erected by the Government; we are sure it would not only be a benefit to the factorymen, but

to the receivers on this side, and help to insure a still higher reputation for Canadian cheese."

PLANS FOR GIVING EFFECT TO COOL CURING.

If the improvement due to cool curing is an admitted fact, the next thing is to consider how the cool curing of cheese can best be carried out in connection with our factory system. Three plans have already been tried to some extent:

1. The shipping of the cheese from the factory to one of the existing cold storages within a few days after they are made.

2. Central or consolidated curing rooms like those established by the Canadian Government for illustration purposes, the operation of which we have been discussing.

3. The improvement of the cheese factory curing rooms and the erection of an ice chamber in connection therewith to secure proper control of temperature and moisture.

SHIPPING CHEESE GREEN TO COLD STORAGE.

The first plan, while it may be better than leaving the cheese in an unimproved curing room for the full period of ripening, is only a half measure, and there are some serious objections to it. It is not practicable to ship the cheese from most factories oftener than once a week; consequently the oldest cheese in each shipment would be exposed to heat long enough to be permanently injured. If the injurious effects of a high temperature are to be avoided, the cheese must be placed in a cool temperature *within 48 hours* after they are taken from the press. Then again, to ship the cheese in a green condition at a few days old to a general warehouse out of reach of the cheesemaker is to deprive him of the advantage of examining the mature cheese in order to study his work and correct defects which would not be discernible during the first few days. Serious consequences would follow in many cases unless there was some check on the cheesemaker's work. These two objections are sufficient to put this plan of shipping green cheese to a central warehouse out of the list of possible solutions of the cool curing question.

CENTRAL COOL CURING ROOMS.

While the central cool curing rooms established by the Government were never intended to encourage the general adoption of such a system, the plan has, nevertheless, a number of features which make it worth considering as a practical working scheme. They may be summarized as follows;

1. The cheese in the central curing room are under the care of an experienced cheesemaker whose business it is to examine them carefully, and to report any defect at once. Having the cheese from a number of factories for comparison, he is in a much better position to criticise intelligently than the man who sees only his own cheese, and is obliged, as it were, to judge himself by himself.

2. The factories are of necessity in the neighborhood of the central curing room, so that the makers have opportunities of inspecting their own cheese and comparing them with cheese from other factories. The spirit of emulation is thus fostered in a very pronounced degree.

3. The cheese are better boxed and more carefully loaded into the cars because it is easier to get one man to do a thing right than to make ten do it.

4. The central system facilitates the selling of the cheese and the proper inspection before delivery.

The disadvantages of, or the objections to, the central curing room plan lie chiefly in the cost of erection and operation as compared with the cost of improving and maintaining the cheese factory curing rooms. The comparative cost would vary according to locality, but on the whole it would cost rather more to build a central curing room than it would to fix up the curing rooms at the factories from which the cheese would come. If new factories had to be built, so that the whole cost of a curing room would be avoided, the relative cost might then be in favor of the central establishment.

As for comparative operating expenses, much depends on the size of the factories. In the largest factories the services of one man can be dispensed with when the cheese do not have to be taken care of or boxed, but this does not apply to the same extent in factories where only two or three men are employed. The cheese must be conveyed to the shipping point in any case, and it costs the patron just as much, and sometimes more, to haul his proportion of cheese as it does when the work is done by contract and he pays his share. Indeed there is a great deal to be said in favor of the contract system of hauling cheese in any circumstances. The contractor is under the control of the parties who engage him, and he can be compelled to provide suitable wagons, always clean, and be held responsible in every way for the proper performance of his duties.

It will cost less to supply ice for a central cool curing room than it would to furnish the required quantity to secure the same results at 10 or 12 cheese factories. A given quantity of ice will waste more divided into several lots than it will stored in one place.

One of the most serious obstacles in the way of the adoption of the central curing room plan, where it might otherwise be practicable, is the lack of a spirit of co-operation among the factories, and some co-operation is necessary to make the plan a success.

The cost of operating the Government curing room at Brockville for the season of 1904 will be interesting in this connection. The total operating expenses were \$2,518.97. This includes \$204.87 paid for extra heavy cheese boxes in excess of what was charged to the factories. There was another item of \$49.12 for insurance on the cheese. Then there is the hauling of the cheese which amounted to \$1,010.25. These items must be paid in some way, no matter where the cheese are cured, and when they are eliminated, as they should be in this calculation, it brings the operating expenses down to \$1,254.73. Deduct from this amount the revenue of \$834.37 from shrinkage saved and it leaves a net deficit of \$420.26 on operating account. Against this deficit there is the extra price for which the cool cured cheese were sold. Exact figures cannot be given for this increased value, but a fair estimate places it at \$1,500. From this showing it is apparent that there has been a clear gain to the 9 factories that sent cheese to the Brockville curing room during the past season of at least \$1,000. This is on 9,740 cheese weighing 790,773 lbs.

IMPROVEMENT OF CHEESE FACTORY CURING ROOMS.

A large number of cheese factory curing rooms have been improved and others partially improved during the past two or three years, and the indications are that it is principally along this line that the cool curing of cheese is to be carried out. This plan does not disturb the existing order of things, and on the whole it would appear to be the one most worthy of recommendation. The necessary improvements can be effected with the minimum of expenses, and no extra labor is involved, either in handling the cheese or taking care of them. The results will hardly be as uniform as they are at a central curing room, and the average cheesemaker will have to learn a good deal about the control of temperature and moisture, the prevention of mould, etc., but these things will come in time. One thing I fear is that too many factories will be only partially improved, that the temperature and moisture will not be fully under control, and consequently the cheese from such places will bring discredit on the cool curing movement. The first requisite for a man who starts out to improve a cheese curing room is a clear conception of what he is trying to do. He must understand that there are *two* conditions which he must control if he would ensure suc-

cess, and they are the temperature and the moisture in the air of the curing room. One is as important as the other. We have not been accustomed to pay much attention to the relative humidity in connection with the curing of our cheese. In the ordinary curing room where the temperature is about even with that of the outside air, there is not often any excess of moisture. Indeed it is more often too dry, causing the cheese to shrink excessively, and to show cracked surfaces in extreme cases; but when the air is reduced in temperature from 10 to 20 degrees, as it is in a cool curing room, the relative humidity is increased very much. Then again in an ordinary curing room the circulation of air that brings in heat also removes the moisture which escapes from the cheese and which is represented by the loss in weight. It is obvious, therefore, that the insulation of the walls necessary to a proper control of temperature by stopping all circulation or passage of air must result in an accumulation of moisture unless some special means are employed to remove it. It is not sufficient to secure a reduction of temperature alone. Without removal of the moisture the excessive growth of mould cannot be prevented and the surfaces of the cheese are liable to be "soft" and show early decay. It is for this reason that it is recommended to have an ice chamber in connection with the curing room, to promote a circulation of air. The air passing over the ice is chilled, dried and purified before returning to the curing room. With such a system installed the air can be kept perfectly sweet and dry enough without any further ventilation. If the building is well insulated and is provided with a cement floor the temperature will not go above 60 degrees except in very warm weather, but it will not do to depend on that alone.

THE GROWTH OF MOULD ON COOL, CURED CHEESE.

Some difficulty may be experienced at first in preventing the growth of mould on the cheese in a cool curing room. If the cheese are kept for a few hours, say over one night, in a dry place at ordinary temperatures, the surfaces become dry and there is very much less tendency to mould when they are placed in the cool room. Provision should be made for handling the cheese in this way. The cheese shelves should be thoroughly cleaned and disinfected with formalin every time they are emptied. When new shelves are procured it is an excellent plan to give them a good coat of boiled linseed oil put on hot. This prevents the wood from absorbing the moisture from the cheese and thus encouraging the growth of mould. The whole interior of the curing room, including ceiling, walls, floors, posts, and shelving, should be thoroughly scrubbed every spring with a

solution of one part of bi-chloride of mercury to 1,000 parts of water. This will destroy all spores of mould, but care must be used in handling the solution on account of its being a very deadly poison. Many of the importers in Great Britain say that a little blue mould is not objectionable, providing the cheese has a perfect skin so that the mould will not penetrate. If the cheese get very mouldy in a curing room, however, they are apt to be very bad by the time they reach England.

SOME SUGGESTIONS FOR IMPROVING CURING ROOMS.

There is so much diversity of construction in existing buildings that no instructions can be given for their improvement except in a general way. The ice chamber should be from one-quarter to one-third the size in cubic capacity of the curing room, according to the efficiency of the insulation used. Many of the factory curing rooms are large enough to allow of the ice chamber being built inside the present walls of that room. The first thing to do is to put a stone or concrete foundation wall under the building, then lay a cement concrete floor over the area of the curing room, and plaster the foundation walls on the inside with cement to give them the same finish as the floor.

The walls of the curing room should not have less than two thicknesses of matched lumber and two ply of good quality building paper both inside and outside of the studs. The spaces between the studs should be filled with planing mill shavings; otherwise more lumber will be required in the walls. In altering some old buildings it may not be possible to fill the spaces between the studding with shavings. In such cases the best plan is to set up light studs inside the present wall and finish with two thicknesses of matched lumber with two ply of building paper between. These studs should be placed so as to leave a space for filling with shavings of not less than 6 inches between the new sheathing and the old. It will be all the better if the new studding stands clear of the old sheathing.

The ceiling of the curing room should have two thicknesses of matched lumber and two ply of building paper under the joists, and at least one thickness of matched lumber on the upper side. The spaces between joists should also be filled with shavings.

Double windows, with tight-fitting sash, each double-glazed, are necessary. Windows should be as small as possible and placed at ceiling of the room.

The door of the curing room should be of the refrigerator style, fitted into a beveled frame.

INSULATION OF ICE CHAMBER IS IMPORTANT.

The ice chamber must have better insulation than I have given for the curing room or there will be excessive waste of ice. The insulation of the ice chamber at the curing rooms has proved to be satisfactory. It consists of 7 thicknesses of matched lumber and 8 ply of building paper. The studs are "staggered," forming a one-foot space to be filled with shavings. (Show chart).

Mr. Eddy:—I want to ask if in warm weather in taking the cheese out of the cool curing room if there is any more shrinkage than there is if it is cured in a warm room?

A. I think there is, the cheese contains more moisture, the more moisture there is the more it shrinks.

Mr. Eddy:—Somebody loses what you gain?

Mr. Ruddick:—The cheeses are shipped very largely in refrigerator cars. Now every cheese that comes to the trade in Montreal is put into the cool room and then it is carried across the ocean in what is known as cold air surface rooms, so these are not exposed to higher temperature afterwards. Of course for the local trade that would be a thing to consider. We regulate that difficulty somewhat with paraffine. It is not sufficient to paraffine a green cheese, they retain too much moisture, after the surface becomes dry, then paraffine the cheese, it helps to retain the moisture. I have seen cheese that had been in store for four months that held its weight because it had been paraffined and other cheese that was not paraffined that lost two and three pounds on an eighty pound cheese. The paraffine is not as effective when the cheese is exposed to high temperature, the cheese swells and the fat exudes. I do not know that I would recommend paraffining cheese to be exposed any length of time to a high temperature.

Mr. Eddy:—In retailing these cheese you would lose more in shrinkage?

Mr. Ruddick:—Yes, the retailer would lose more after he cut it if left to stand a great length of time.

President Bruce:—Any further discussion of this very interesting subject? Any one interested in cheesemaking should not be afraid to ask questions.

I will now announce the Committee on Resolutions:

Hon. Josiah Grout, chairman; A. J. Croft and C. F. Eddy.
Adjourned.

Tuesday evening, Jan. 11, 1905.

Woman's Auxiliary to the Vermont Dairymen's Association. Called to order at 7:30 P. M. by President Bruce. Music was then furnished by Wilder's orchestra of Montpelier.

President Bruce then said:—I believe it is a pleasure to the Vermont Dairymen's Association to have the ladies with us in our meetings, and now in this meeting of theirs we are very glad to help them in any way we can.

I now have the pleasure of introducing to you the President of the Woman's Auxiliary to the Vermont Dairymen's Association, Mrs. Le Page of Barre.

Mrs. Le Page:—Mr. President, ladies and gentlemen: We are happy to meet once more in this fair city now nearing its one hundredth anniversary as the capital of our State.

Great indeed are the changes the years of that cycle have brought to us. Agriculture has kept pace in the march of improvement and has changed from a primitive to a scientific occupation which enables the farmer to occupy as prominent a place as he does today.

The agricultural societies recognize the equality of the sexes and permit woman's companionship in their work, and to them is due the success of the Woman's Auxiliary to the Vermont Dairymen's Association, which was organized eleven years ago and which has had one evening of each yearly session set apart for its use. It is in accordance with that custom that we are gathered here this evening when we feel sure that we can entertain you. The first upon our program is a reading by Mrs. Kate E. Terrill of Montpelier.

After a reading by Mrs. Terrill, Mrs. Le Page further said:

I have the honor to introduce to you his excellency, Governor Charles J. Bell of Walden, who will now speak to you.

Governor Bell:—Mrs. President, my friends: It gives me great pleasure to come before you this evening at this Woman's meeting.

I remember years ago when I first went to the dairymen's association it so happened that one of the officers of the association brought his wife to the meeting and it was so remarkable an incident that the papers remarked about one man being so liberal as to bring his wife to a dairyman's meeting.

Times have changed somewhat. The president said tonight that they were very glad to be present at the meeting of the Dairyman's Auxiliary, and I want to say to the President of this Auxiliary that the Dairymen's Association would not have been alive today if it had not been for the Woman's Auxiliary.

That Auxiliary has aided the Association so that today the Vermont Dairymen's Association is the leading dairymen's association in the country.

We must remember that in Vermont, without any discredit to any one who may be present from another state, that Vermont makes more butter to the acre than any other state in the union. With this Association to aid it and to protect it and with these experts from Boston to come up and tell us who makes the best butter, there is no reason why we should not continue to do so. We make butter, it is something Vermont takes pride in because there is something about Vermont that aids us; with our machinery and the best methods that can be used to make the best butter. It is something we should take pride in, and the Woman's Auxiliary has more to do with it than the men have.

Why, my friends, it is worth the ambition of a life time to be invited to speak to a Woman's Auxiliary like this. I am very glad indeed to be here to-night, if I may say one word longer in this line, to see these nice ladies before me and I almost feel like the old man in the recitation, and I do think this matter of fixing up the barn at the expense of the house is something that should receive our attention. I know one county in Vermont with its farms and homesteads, and it is a grand butter county, but there they will spend fifty dollars on the barn where they will live in the house. That is all right in its way because that is the fashion in the county. There are other counties perhaps that go too far the other way. It is well to think yourself kings because you are the owners of the soil but we must remember the best part of the family is in the house and we should have good houses and pleasant surroundings before we have fine barns and more cattle. But we can have both in Vermont.

We should take more pride in our farm surroundings than we do. We go into the fine villages and cities and we admire what we see. We come to Montpelier and we admire the beautiful streets, the fine houses and the well-kept lawns, but there is no reason why the farmer should not take just as much pride in his surroundings, in his house, his barn and out-buildings, his well mown yard. We feel better and are worth more dollars in our estimation if we take more pride in our occupation. We add dignity to our occupation by so doing.

We come here and discuss matters that are of interest to every one of us; we come here with the experts from the city and when we go home we ought to be able to make better butter, to make better sugar and to get more satisfaction out of our own occupation.

Our sugarmaking is something Vermont should take more pride in than she does. There is something about Vermont that permits her to make better sugar than any other state in the union. There is nothing to equal her. We should foster that industry the best we can.

The farmers' wives are doing more for the prosperity of Vermont than are some of us old men, in the matter of being careful in our attempts to do our very best.

We take less pride sometimes than we should. The women-folks we must admit always take pride in good house keeping; the surroundings of the house should be improved as I have said and then there is the machinery! Most farmers think they must have all the improved machinery and it does seem as though house keeping might be made easier than it once was, but there is something about the ladies' dispositions that seems always to keep them busy. A few years ago after the sewing machine was invented we thought there would be no more sewing to do, but they have managed to put more yards of cloth into a dress, and to take more stitches in the making than there ever was before so there seems to be just as much sewing to be done as there ever was.

But there should be some way whereby the ladies on the farm should enjoy this grand old State of Vermont more than they do, and although we do have to work so hard we can if we will, manage our business so we can get more of that enjoyment and have our families get more enjoyment as we go along or we never will get it.

With our good roads, our high mountains and our beautiful rivers, we can get our health and keep it as well as anybody else in the world, and the ladies and children too should come out to the meetings of this Association and to the Grange meetings and interest themselves in them.

Vermont takes pride in her ladies; she takes pride in her mountains, in her lakes and rivers! Let us enjoy things as we go along. The boys and girls who are growing up on the farm today and who will go out into all the rest of the world should be rightly brought up to appreciate their surroundings.

That leads me to think of just one word more: Since I have been Governor of Vermont I have had no end of letters from men confined in the penal institutions of our State asking to be let out for one cause and another, and about all the men that have said anything about their bringing up, and where they have given run as the cause of their downfall they have said they were boys that were not brought up as they should be, in some cases they had lost their father or their mother. Now there is one lesson that must be learned from that, that is that

boys and girls need a little discipline. I need not say that all of us need discipline very much. I hear fathers and mothers say they want their boys and girls to have a better time than they had. I don't know as I want my boys and girls to have any better time than I did. I have always had a good time and always mean to as long as I live. First, you want health, you want health and a clear conscience, something to eat and you will be all right. Bring up the boys and girls to get what there is in life, to help lift the standard of the farm; that the farmer is just as good as somebody else and a little better, if the other fellow does not behave as well as the farmer does. One reason we do not take pride in our occupation is the professional man selects something he likes for his life work. He educates himself for it until he understands in a measure his business and thinks it is the very best one in the world. He goes into it but he fails in about seventy-five cases out of a hundred.

The farmer must select something he likes first, then educate himself in it and he has got to succeed, there is but very little doubt about that, but at the same time he has got to have his health and he has got to be happy and contented with his surroundings.

The professional man, as I have said adds dignity to his profession because he is always speaking well of it; we lower our occupation by saying so many times that farming don't pay. It does not pay us as it should because we do not realize any pay but a pay in dollars and cents. Take all those things into consideration, take your house and make it pleasant and cheerful for the dear ones in it, make it neat and well kept on the outside and around the yard, enjoy your farm and your work and make your boys and girls enjoy it too. We have lowered the value of farms in Vermont by saying that farming did not pay. You do not hear professional men, mechanics or merchants say their business does not pay; they would almost even tell a lie before they would say it, and how is it that we are willing to say it does not pay even when it does?

I know a little town in the State of Vermont where you would not find a man with a farm who would say that farming pays. They do not mean to tell a wrong story about it and yet they say farming does not pay, but they are building better houses and they are building better barns, they are driving better horses, riding in better sleighs and buggies; their wives dress better and their boys and girls are better educated, and yet they say farming does not pay.

In that town they say they are milking more cows than they ever did before; the lister tells me that twelve years ago there was only about eight or ten thousand dollars in that town held

in the savings bank when the listers went around and now there is more than \$70,000. Somebody has made a dollar in that town, they have been spending more money, living better and yet they say farming don't pay. Cheer up, my friends, I believe that farming does pay, if it does not always pay us largely in dollars and cents it pays us in good health and enjoyment and when you have those things you have all there is in life.

There are some things in Vermont that are the best there is anywhere. We have the best Dairymen's Association; we have the best Sugarmaker's Association, we have the best wives, daughters and sons, we have the best granite and the best climate that can be found anywhere. Speak up for Vermont and especially for the Vermont State Dairymen's Association and the Woman's Auxiliary.

Mrs. Le Page:—To those of you who read the New England Homestead, the gentleman who is now to speak to you needs no introduction, to you who do not, I take pleasure in introducing Mr. Will Templer Becker of Schenectady, N. Y.

Will Templer Becker:—Madam President, ladies and gentlemen. I am glad to have heard some of the resources of this delightful State of yours and I want to assure the Auxiliary and all of you, in fact, that the fame of this noble State has travelled far. We appreciate it and know something about it over in New York State. We cannot all live in Vermont, the State is not big enough, but we know a little bit about it. Why, when a stranger comes to New York from the North, South or West and is about to get up in the morning he points off toward the east and says, what is that glorious light I see in the sky? and we say, that is the sun arising out of Vermont. (Applause.)

And, says he, what is that delightful perfume I smell? And we say, oh, that is the aroma arising from the sap bushes, the flower gardens, the orchards and the forests of glorious old Vermont. And; says he, what is this busy hum I hear? Oh, that is Vermont tapping trees, separating cream and carving grave stones for you after you are dead. (Applause.)

It takes but a slight stretch of imagination to see Vermont as I first saw it as a boy. It appeared to me as a long green ribbon stretched north and south on the map of New England; its smaller edge on Massachusetts, while Canada, resting serenely on the upper edge apparently kept the top-heavy green mass from tumbling into the Connecticut River on the east or Lake Champlain on the west. Then there were the Green Mountains running north and south as a sort of spine to stiffen the great green ribbon, and there were descriptions of green fields and green

forests and green mountain boys—the latter always more or less a puzzle to me for I could never settle the question in my mind whether they were green boys off any old mountain, or any old boys off a green mountain. My first school history did much to dispel the idea that all Vermonters were green, and to my certain knowledge all persons who have had dealings with them have ascertained the fact without learning it from a book.

I have said that my first school history helped me to gain further knowledge of the natives of your State. There was the picture of the taking of Fort Ticonderoga; its central figure was Ethan Allen, tall and gaunt and smooth-shaven, clad in a buckskin hunting shirt and leggings and with a three-cornered hat on his head, brandishing a sword nearly as long as himself while he demanded the surrender of the fortress in the name of the Great Jehovah and the Continental Congress; and with him was a score or more of other Vermonters looking just like him, all mightily interested in the proceedings, all pointing their bayoneted flintlocks at the British commander, clad in a single diaphanous garment, and who was evidently dreadfully tickled at the reasonableness of Allen's demand.

Then a little later came the exciting account of how Gen. Burgoyne with his glittering array of British, Hessians, Tories and Indians came sweeping up Lake Champlain to divide and crush the colonies; and another picture showed another crowd of long, lean, smooth-shaven buckskin-clad Vermonters going out to meet the enemy at Bennington. One named John Stark marched at their head, and he proclaimed to all the world as he marched that the British would that day be beaten or Molly Stark would be a widow before the sun set.

This impression of Vermont and the Vermonters endured in my childish imagination during the dark days of the civil war when 35,242 tall, sinewy, smooth-shaven men out of a total of 60,719 men of your State subject to military duty donned Uncle Sam's blue instead of the traditional buckskin, and, turning their faces toward the front marched southward to the tune of: "We are coming Father Abraham, three hundred thousand more."

In addition to these early impressions the people of the Mohawk valley were possessed of traditional knowledge that all Vermonters inherited great business acumen and corresponding thrift, that they invariably spoke in a sort of Yankee dialect and that they were greatly given to driving peddler's carts. I am to be pardoned then when I say that in the days that followed, if a tall, lean, smooth-shaven stranger drove a tin peddler's cart into our yard and proclaimed in a nasal voice that he "Guessed he had abaout th' best goods there was t' be faound, and if we had any rags in th' haouse, he was ready for a trade," we

sharpened our wits accordingly for we were pretty sure we had a Yankee to deal with, and from his general appearance we reckoned he was a Vermonter. Ah, well, there is always hope for one who knows enough to know that he don't know much, and I hope I have arrived at that place. It matters not whether the men of a state be tall or short, lean or fat, smooth-shaven or be-whiskered, buckskin swathed or broadcloth clad, whether they speak in the reputed nasal twang of the Yankee or the much quoted, soft, southern drawl. "A man's a man for a' that and a' that." In every age of the world there has been a demand for real men, and in our modern times the demand has increased rather than diminished.

I thank you for the privilege of standing tonight in the land of intelligent, educated American men and women, this land of Morgan horses and thorough-bred sheep and cattle, of marble and of slate, of milk and sugar, where the song of the plow has ever risen superior to all other industrial music and of speaking to an audience comprised of the descendants of Ethan and Ira Allen, Jonas Fay, Thomas Chittenden, Seth Warner and John Stark and in the home of Justin Morrill, Redfield Proctor, George Dewey and Charles E. Clark.

Sometime ago I received a letter from Secretary Davis in which that deluded man gave himself away in the very first sentence: "You are a lucky man," he wrote, "you are to address the Ladies' Auxiliary." There comes a time in the life of every true man when he must prepare an address to the ladies, or, to a lady, rather, and on this momentous occasion he is prone to rack his brain for language logical, convincing and entrancingly beautiful.

When I received Brother Davis' letter I did not feel half so good about it as he did. True, he had no means of knowing that fate had twice required of me that I search my brain for language logical, convincing, and entrancingly beautiful, and that the double effort had somewhat exhausted my vocabulary of pretty talk, else he would have given me an easier one. You will therefore excuse me on the ground of incompetency if a continual string of beautiful pearls of thought do not drop from my lips and if I confine myself more to the homelier things of life for it is of *life* that I will speak.

A convention of dairymen is necessarily a convention of rural dwellers. As such, every man and every woman is interested in country life, whether it comes to them laden with the sacred memories of a happy past, abides with them in the strenuous, golden present, or stirs the blood while planning for themselves and the loved one who are to come after them a future of peace, plenty and prosperity. In all the walks of life there

is no occupation that causes lives to so closely intertwine or that draws men and women so near to each other in a mutuality of interests as does that of farming. The business man goes to his desk, the professional man to his office, the commercial man packs his grip and is away, and the mechanic takes his lunch box and is off to the shop. The outcome of the labors of these is to the wife at home a familiar, though vague proposition. She knows these daily goings and comings are necessary to the well being of all concerned, but she is so seldom brought into real contact with the business life of her husband that it is impossible for her to show the interest or sympathy in his work that she otherwise would.

It is wholly different with the woman of the farm. Be she wife, mother, sister or daughter, she is the integral part of the life of the husband, father, brother or son as he is of hers. Man, in other occupations is not noted for letting woman know his business, *here* he can't help himself, and it is a mighty good thing that he can't for of all the excellent things on the farm, man and his kind included, a good woman is the very best. She notes with satisfaction the disappearance of the snow and the gradually lengthening days in spring time; the boastful cackling of the egg producing hen and the bleating of the new born calves and lambs are music to her ears. Indeed if she had time to indulge in such luxuries I am not quite sure she would not try the man's cellar door cure for spring fever.

Next, when comes that sweet agony, so dear to the hearts of all women, the spring house cleaning, when the carpets and the mattresses are spread on the lawn, the clothes lines full of blankets and bed linen, pillows hanging out of the windows, step ladders and white wash brushes in evidence, and the dining room table full of household implements, dishes and medicine bottles out of the pantry and the good wife, as our Irish friend once put it is "Niver takin' a resht ixcipt fwen she's in motion," she has only to turn her eye toward the field to know how the plowing, the planting or the sowing is coming on, her ear toward the barn to know the condition of the flocks and herds, or toward the pig pen or chicken coop, to discover a chance to *rest* while she soothes the hungry occupants with a little feed. Is there any doubt of her being interested? Is there any doubt of her being an important factor in the business of the farm? Is there any good reason why she should not be a full sharer in the profit? Then when that fellow comes in from the field and does the Bowser business because he has to eat off the head of a barrel one day in the year, or kicks because she asks him to prepare a flower bed or beat a carpet while the horses are eating. I think, if there is nobody else to do it, when he comes to his

senses, he ought to go out behind the barn and administer to himself a good sound kicking.

But *will* that husband ultimately perform the little duties required of him? Will he take counsel of that good wife and in most cases abide by her advice? Will he make her a sharer of his hopes and ambitions, his joys and his sorrows, and withal, a sharer in the profits of the farm instead of throwing her a dollar once in a while on her application, much as he might fling a bone to his dog? He will, if she is the right sort, and most good women are. He may strut around at town meeting or at an auction and proclaim to his fellows in a pompous voice that he is boss in his own home! but he isn't, and away down in his heart he knows he isn't. Not that I would have man exercise undue humility; there is such a thing as overdoing the matter.

Laying aside the question of who should be boss in a well regulated family,

"Let us go back to the shady woods,
The orchards and fields of clover,
Let us return to our childhood's days,
And in fancy live them over."

No matter what our childhood may have been, no matter what privations we may have undergone or what hardships we may have endured during that period of our existence, we, especially those of us on whose heads the frosts of autumn have begun to fall, one and all look back upon the period of our childhood as the happiest of our lives. Having never been a city child, I cannot speak from experience, but I cannot imagine how the life of a child brought up in a large city can compare with that of one country born and bred. The play-ground of the former is the side-walk and the gutter, with an occasional outing in the city park, all his strolls for pleasure, all his goings and comings are confined to pavement and flagstones, his sky is bounded by brick and stone. Environments are artificial and unnatural; he soon becomes wise to the works of men, but he cannot by himself find out what God hath wrought. On the other hand the country child is born in the very lap of nature and he soon begins to partake of all her gifts. For him exist land and water, earth and sky. To him belong the shady woods with their teeming wealth of sights and sounds; his is the blossom crowned orchard, the rushing trout streams, the waving grain field, hill, mountain and plain. He is heir to all the earth and the fullness thereof. The world is his playground and he reigns a king. Properly nurtured, trained and educated, he and his kind become in manhood veritable kings, for it is a

significant fact that more than seventy-five per cent. of our leading statesmen, soldiers, sailors, financiers and professional and business men are country born and bred. Oh, the glorious days of childhood! When every day is a golden gem, every night a jewel set with diamond stars, when we have everything to gain and nothing to lose, everything to learn and nothing to forget. Time and again I have asked men and women if they would like to return and live their childhood over again. Almost invariably the answer has been; "No, I scarcely think I would, but I would not be bereft of its *memories* for the wealth of the world."

But our boyhood and girlhood dream is over and we are men and women. Unhappy, indeed, must he be who looks back with regret and bitterness upon those days, thrice happy he who gazes back through the mellow mist of years with nothing to regret, but who, with the dear memories walking ever by his side, goes forth daily to do and to dare, because of these a better father or mother, a better son or daughter, a better husband or wife, a better citizen, a better man or a better woman.

"How does it come, dear," said a wife to her husband, "that married men live so much longer than single ones?"

"They don't my love, replied the brute, "It only *seems* longer."

Those old days were no better than we are enjoying today, they only *seemed* better. No man need regret having been born too late. Every year is better than the preceding one, every month a better month, every week a better week, every day a better day—richer in knowledge and advancement, richer in human sympathy, charity and love, richer in the spirit of the brotherhood of man and the fatherhood of God, richer in opportunity to make the world wiser, happier and better for our having lived. If every generation was not an improvement on the last, the world would make no advancement.

I have no use for the pessimistic theology that persists in calling this bright world of ours a "vale of tears" or in that narrow spirit that would crush all the joy and happiness out of life in the almost hopeless task of getting to heaven. That he who placed us here meant us to be happy is very evident, else he would not have made the world so beautiful, or given us so many ways of pouring joy into our lives.

In this life of ours there are two essentialities to peace and contentment: they are happiness and success. The unhappy man is seldom successful, the successful man has no time to be unhappy.

"The love of money is the root of all evil," says the good St Paul, yet strange to say most of us find it a mighty convenient root to have around, and we are very prone to measure

the success of our friends and ourselves by the amount of evil root collected and at hand.

Granted that the possession of money is essential to our needs and desires, granted that the struggle to accumulate sufficient wealth against the time of need or for those who are to come after us is a praiseworthy object, the fact still remains that the richest men are not always the most successful or the happiest for there are essentials to happiness that money cannot buy but which are within the reach of any one and every one who will cultivate a habit of living in touch with all things that make life worth living. Such a man as this is a happy man, and he cannot help but shed a happy influence on all he meets. When he is called from this life, although he will leave but little behind him by way of actual wealth, it will be said of him: "He left it all; he took nothing with him."

There is another idea abroad, that only through wealth can we attain to high official or professional positions and thereby gain an entrance into what is known as "Society." It should be a matter of congratulation that the prizes are so few and that so few of us have the necessary qualifications to aspire to these high places that we can afford to turn to humbler things on which to build our ideas of success and our hopes of happiness.

The speaker here related an interesting story of J. Howard Hale, the well known peach king of the Connecticut Valley, and continuing said:

And who shall say that J. Howard Hale is not a successful man. A poor boy, born on the farm, he finds himself today in the prime of life, by no means a rich man but a man with a world wide reputation as the largest and most successful peach grower on earth, and the originator of scores of varieties of delicious fruits that will make his name remembered when those of Senator Cash and Congressman Graft shall have perished from the earth. And, ladies, don't you think that his wife is an excellent variety of "Hale's Peach?"

Every man and woman owes a duty to society, for it is by association with our fellowmen that we derive most of our benefits and our pleasures. So, ever remembering that it is from without rather than from within that we draw nearly every sweet and wholesome thing, we have no right to hide our own talents from others. One of the best things for a man to invest in is the good will of his fellows.

As to "Society" as it is known to the idle rich, if success and happiness depend upon a life of luxurious ease, frivolity, and superficiality with a background of sham, scandal and divorce proceedings, then let us of the so-called "middle class" bow our heads in humbleness of heart for most of us will never be happy.

There is no law to prevent a man's dressing up like a Harlequin's monkey and go galloping across country after a pack of yelping dogs if he wants to, nor of a couple selling their daughter for an impecunious foreign title, nor of stopping an idiotic woman from giving a pink tea to all the poodles in the set her poodle belongs to, but when these people, not one in ten of whom ever earned an honest dollar in his life, begin to talk glibly of the line of demarkation between the classes and the masses, and of an American aristocracy based on the European plan, the senses of every sensible, patriotic man and woman from Maine to California reel as with a nausea and it is about time that we begin anew to preach the gospel of our ancestors, written in blood and privation at Bunker Hill, at Bennington and at Saratoga, lest we awake some morning and find a billionaire snob crowned king of this republic.

From society to soil is a long hark, but as all things originate from the soil, so in course of time all must return to their common mother. In these days we hear much of abandoned farms, worn out soils and discontent with country life. Men complain that life on the farm means hard work and a mere living; they seem to forget that only about one man in ten, in any walk in life does accumulate money or property. These put themselves in the very human position of imagining every other man's occupation pleasanter, less laborious, more remunerative, than their own, and with no ambition to rise above the level of earning a day's wage abandon the soil, oftener than not to their undoing.

In the old days, when the soil was new and rich and the earth produced almost spontaneously, anybody who knew enough to sow, reap and to care for could be a more or less successful farmer. But we have overdrawn our account in nature's bank of fertility and we have not made deposits adequate to our withdrawals. Our kind and bountiful mother still has vast deposits to our credit, but she is tired of doing it all and demands in no uncertain voice that if we have her help we must do something towards helping ourselves. Mere strength and ignorance are no longer at a premium in agriculture. Science and education have taken their places.

No longer is anything that stands on four legs and gives milk regarded as a cow. She must show a paying amount of butter fats or go to the slaughter house. The haphazard feeding of buckwheat bran and cornmeal to milk producing cows has given place to the balanced ration. The oats in the north field fall down and rust only once, for next year the necessary mineral matter is restored to the soil and nature does the rest. The fowls no longer roost in the apple trees, neither is the discovery of a frozen egg in February regarded as a phenomenon.

We are no longer content to haul our produce to market through mud to the hub, for we are beginning to realize as facts what our horses knew twenty years ago. If the trolley car does not whiz past our door we know that it soon will; the postman drops us the daily mail; and the telephone annihilates distance between friends and neighbors. These are but a few of the contrasts between the old fashioned farming and modern agriculture. Too long have we been hardening our hands at the expense of our brains, and the man who continues in the old way will remain a poor farmer and a poor man all the days of his life.

Rome was not built in a day, neither will the whole fabric of country life and rural society be brought to the highest standard in a day, a month, a year or a generation. There is the porcupine biped with the brain of a mule. Every community has at least a specimen of him. He is the man who wont give his wife a dollar unless she begs for it, who wont hire a girl to assist in the housework, but expects her to do it all, besides helping to milk, feed the calves and pigs, care for the poultry and work in the garden. He is the man who kicks on paying the teacher more than five dollars per week, who gives his sons twenty-five cents apiece to spend on the Fourth of July and who insists on buying the calico for his daughter's dresses.

He don't believe in book farming "no how," and takes no stock in books, newspapers and magazines, music, bicycles, amusements of any kind, nor in higher education for any one, much less a woman. He don't believe in going a visiting and wont join the Grange. He looks on the good roads movement as a scheme to rob him, and hides his long ears under the cloak of conservatism.

Happily the "conservative" is drawing beautifully less and after a time we will be rid of him altogether. But the poor, slack farmer, the man who is always striving to keep his ambition below what his constitution will stand will be with us always.

Mrs. Le Page:—The next thing on our program will be a reading by Mrs. Kate E. Terrill.

After music by Wilder's orchestra the session of the Woman's Auxiliary was adjourned.

LADIES' AUXILIARY.

The special meeting of the Woman's Auxiliary was held in the parlors of the Pavilion, Jan. 11, 1:30 o'clock. The meeting was called to order by the President and opened by the Ladies repeating the Lord's Prayer. Secretary's report read and approved. A very interesting paper was read by Mrs. C. M. Howe of

Barre, subject, "Farmers' Wives and our Rural Schools." This was followed by the Question Box, conducted by Mrs. Hepzie Aseltine. Then the question came up, "Shall we have an initiation fee?" It was discussed and finally voted and decided to charge a fee of 25 cents for annual dues.

The same officers were re-elected for the coming year.

President,	-	-	-	-	MRS. ETTA LE PAGE
Vice President	-	-	-	-	MRS. HEPZIE ASELTINE
Secretary and Treasurer	-	-	-	-	MRS. EDNA S. BEACH

LIST OF NEW MEMBERS FOR 1905.

Mrs. F. W. Draper.....	Enosburg Falls, Vt.
Mrs. R. E. Burnett,	Bethel, Vt.
Mrs. Anna Bellows	Panton, Vt.
Mrs. C. L. Parmenter.....	9 Vine St., Montpelier, Vt.
Mrs. Cora Bates.....	East Barre, Vt.
Mrs. W. C. Nye	East Barre, Vt.
Mrs. C. M. Howe.....	Barre, Vt.
Mrs. H. C. Bruce	Sharon, Vt.
Mrs. Geo. B. Walton.....	Montpelier, Vt.
Mrs. W. E. Ducharme	Barre, Vt.

The meeting closed by singing America.

LIST OF MEMBERS OF WOMAN'S AUXILIARY.

Mrs. Margaret M. Reed.....	Burlington
Mrs. Mary H. Pitkin.....	Marshfield
Mrs. Carrie A. Nelson Shackford.....	Ryegate
Mrs. Annie Dodge.....	Morrisville
Mrs. Mary A. Smith.....	Morrisville
Mrs. D. D. Howe.....	Burlington
Mrs. Mary R. Ralph.....	Brookfield
Mrs. A. L. Walker.....	South Woodstock
Mrs. Elinor T. Clark.....	Brookfield
Mrs. E. P. Carpenter.....	Waterford
Mrs. S. J. Hastings.....	Passumpsic
Mrs. F. S. Collins.....	Burlington
Mrs. George Crane	Wilmington
Mrs. C. J. Bell	Hardwick
Mrs. L. R. Jones	Burlington
Mrs. C. M. Winslow.....	Brandon
Mrs. J. O. Sanford	Stamford
Mrs. Mary Kibbe.....	Brookfield
Mrs. Louis W. Clark.....	Brookfield

Mrs. A. B. Manchester.....	Randolph
Mrs. T. F. Betterley.....	West Brattleboro
Mrs. C. H. James.....	Cornwall
Mrs. Alvira A. C. Ware	Brattleboro
Mrs. Sarah J. R. Whitman,.....	Brattleboro
Mrs. C. D. Hazen	Wilder
Mrs. Jennie Bronson.....	East Hardwick
Mrs. Ida M. Pierce.....	Brattleboro
Mrs. Jennie L. Brock	Barnet
Mrs. F. L. Smith.....	Fletcher
Mrs. M. W. Clark.....	Williston
Mrs. John Smith	Newbury
Mrs. Jennie S. Bentley.....	St. Albans
Mrs. M. A. Curtis.....	Georgia
Mrs. M. B. Fuller	Georgia
Mrs. C. E. Martin.....	Rochester
Mrs. E. W. Smith.....	East Berkshire
Mrs. F. R. Towne.....	Waterbury
Mrs. R. B. Galusha.....	South Royalton
Mrs. H. M. Crane.....	St. Albans
Mrs. O. T. Sunderland.....	Georgia
Mrs. M. L. Aseltine.....	North Fairfax
Miss Elma Eldred.....	Sheldon
Mrs. E. M. Denney.....	Montpelier
Mrs. Fanny A. Drew.....	St. Johnsbury
Mrs. C. H. Higgins.....	St. Johnsbury
Mrs. Alma F. Waters.....	St. Johnsbury
Mrs. Mary A. Brackett.....	St. Johnsbury
Mrs. Genevieve S. Davis.....	North Pomfret
Mrs. Bessie H. Strong.....	Thompson, Conn.
Mrs. S. A. Vail.....	North Pomfret
Mrs. I. C. Houghton.....	Lyndon
Mrs. L. F. Bickford.....	Bradford
Mrs. L. H. Davis	Barre
Mrs. J. E. Bass.....	Randolph
Mrs. Edward C. Smith	St. Albans
Mrs. Jennie S. Wood.....	Winchester, N. H.
Mrs. Sophia B. Craddock.....	Brattleboro
Mrs. Ella A. Eames.....	Brattleboro
Mrs. Almira L. C. Robbins.....	Brattleboro
Mrs. Susan F. Lowe.....	Brattleboro
Mrs. H. D. Thayer.....	Brattleboro
Mrs. M. I. Reed.....	Vernon
Mrs. W. C. Cushing.....	Vernon
Mrs. A. A. Mason.....	Townshend
Mrs. E. B. Batchelder.....	Townshend

Mrs. Callie S. Talcott.....	Williston
Mrs. T. H. Lyster.....	St. Johnsbury
Mrs. M. B. Leach.....	Essex
Mrs. W. S. Hastings.....	St. Johnsbury
Mrs. J. A. Leary.....	Jericho
Mrs. P. B. B. Northrop.....	Sheldon
Mrs. W. H. Whitcomb.....	Jericho
Mrs. Isadora A. Candon.....	Pittsford
Mrs. Mary H. McCormick.....	Rutland
Mrs. Etta W. LePage.....	Barre
Mrs. Winnifred Sprague.....	East Brookfield
Mrs. Ida H. Read.....	Shelburne
Mrs. G. E. Davidson.....	Newfane
Mrs. A. Elizabeth Sherburne.....	North Pomfret
Mrs. F. M. Bigelow.....	Essex
Mrs. Elizabeth B. Lund.....	Burlington
Mrs. Sarah J. Rice.....	Burlington
Mrs. Edna S. Beach.....	Charlotte
Miss A. M. Bell.....	East Hardwick
Mrs. Della J. Gile.....	Morristown
Mrs. Annette M. Sherwin.....	Hyde Park
Mrs. T. E. Donahue.....	Hinesburg
Mrs. D. G. Donahue.....	East Charlotte
Mrs. Lottie A. Terrill.....	Morrisville
Mrs. Sarah D. Coburn.....	East Montpelier
Mrs. Phoebe C. Adams.....	Stowe
Mrs. S. C. Pike.....	Marshfield
Mrs. J. A. Nesser.....	South Burlington
Mrs. Alice W. Colby.....	West Berlin
Mrs. J. A. Kelton.....	East Montpelier
Mrs. George Cochran.....	Ryegate
Mrs. E. C. Hillis.....	North Montpelier
Miss Mabel F. Coburn.....	East Montpelier
Mrs. J. A. Coburn.....	East Montpelier
Mrs. H. H. Templeton.....	East Montpelier
Mrs. Rogene E. Herrick.....	West Milton
Mrs. L. A. Gilman.....	Randolph Center
Mrs. F. W. Ayers.....	Essex
Mrs. C. W. Guernsey.....	Montpelier
Mrs. F. T. Hutchinson.....	Worcester
Mrs. A. C. Hall.....	Putnamville
Mrs. J. C. Peck.....	Morrisville
Mrs. Oliver Drew.....	South Burlington
Mrs. Alice M. Carpenter.....	Cambridge
Mrs. F. L. Russell.....	Shrewsbury
Mrs. C. J. Pameter.....	Montpelier

Mrs. H. Brown.....	East Montpelier
Mrs. Leonora H. Mimms	41 High St., St. Albans
Mrs. C. C. Gates.....	N. Hartland
Mrs. Cyrus A. Bump.....	W. Salisbury
Mrs. W. S. Haynes.....	Middletown Springs
Mrs. A. J. Haynes.....	12 E. Washington St., Rutland
Miss Nellie Barney	72 Liberty Ave., Rutland
Mrs. L. R. Burr.....	N. Clarendon
Mrs. Edward Nichols.....	Bridport
Mrs. D. K. Hall.....	Rutland
Mrs. W. O. Baird.....	Pittsford
Mrs. H. L. Winslow.....	N. Clarendon
Mrs. R. S. Wetmore.....	Pittsford

EDNA S. BEACH, Secretary,
Charlotte, Vt.

Wednesday A. M., Jan. 11, 1905.

The morning session convened in Blanchard's Opera House. It was called to order at 9:30 by President Bruce, who said:

"We will vary the program a little and listen to the reading of the butter and cheese score by our Secretary."

NOTE THIS CHANGE IN PREMIUMS.

IMPORTANT.

Instead of receiving special premiums from different firms interested in Dairy Machinery, Butter Salt, Butter Color, Butter Cultures, etc., we, this year, are soliciting funds which will be added to the Association fund.

All butter and cheese sent to this convention will become the property of the Association, to be sold and added to the fund and this money to be divided pro rata to those whose butter and cheese scores above 90. Voted to continue the same rules the coming year.

Butter Funds and Names of Donators.

Worcester Salt Co., Boston, Mass.....	\$25 00
Alderney Butter Color Co., New York.....	25 00
De Laval Separator Co., N. Y. and Stoddard Mfg. Co., Rutland, Vt.....	25 00
Colonial Salt Co.....	15 00
Empire Separator Co., Bloomfield, N. J.....	10 00
Wells & Richardson Co., Burlington, Vt.....	10 00
Chas. Hansen Laboratory Co., Little Falls, N. Y.....	10 00

L. M. Cameron, Montpelier, Vt.....	\$10 00
J. B. Ford Co., Wyandotte, Mich.....	10 00
Diamond Crystal Salt Co., St. Clair, Mich.....	10 00
F. E. Smith, Moscow, Vt.....	10 00
O. Douglass, Boston, Mass.....	5 00
O. Bent, Boston, Mass.....	5 00
Geo. Cushman, Boston, Mass.....	5 00
I. H. Ballou & Co., Boston, Mass....	5 00
Standard Package Co., Boston, Mass.....	5 00
F. L. Davis, North Pomfret.....	5 00
Mr. Allen, Springfield, Mass., for butter	270 00
For butter and cheese sold in Montpelier.....	26 28
Total.....	\$486 28
Association Funds	250 00
Total Butter Fund.....	\$736 28

From this amount we deducted express charges which were nearly \$50.00. Several sent more butter than was required and we had to pay back. The balance went to the exhibitors according to the score.

Following are the scores of butter and cheese at the 35th annual meeting of the Vermont Dairymen's Association, held at Montpelier, Vermont, January 10, 11 and 12, 1905.

Gold Medal and Creamery Sweepstakes' Cup.

L. W. Smith, North Danville.....Score 98

Dairy Sweepstakes' Cup.

O. G. Carpenter, Cambridge.....Score 97½

Whole number entries of butter.....	132
Highest score.....	98
Lowest score	88
Average score.....	94
Whole number entries of cheese.....	9
Highest score	98
Lowest score	90
Average score	94

DAIRY CLASS.

<i>Name and Town</i>	<i>Separator</i>	<i>Salt</i>	<i>Color</i>	<i>Score</i>
M. J. Lewis, Woodstock....	U. S.	W.	A.	92
J. C. Lilley, N. Montpelier	D. L.	W.	W. R.	96
Cleveland Colvin, W. Rutland		W.	A.	93

G. F. Green, S. Pomfret....	U. S.	W.	A.	92
E. L. Briggs, N. Pomfret....	Am.	W.	A.	95
R. E. Burnett, Bethel.....	D. L.	W.	A.	93
W.H.Harrington, N. Pomfret	Emp.	W.	A.	95
G. K. Sprague, E. Brookfield	D. L.	W.	W. R.	93
J. B. Carrigan, Pittsford....		D. C.	A.	95
L. D. McIntosh, S. Royalton	D. L.	W.	W. R.	95
G. R. Maxham, Woodstock..	U. S.	W.	W. R.	91
H. W. Elliott, Holden.....	D. L.	W.	A.	91
D. A. Kneeland, Waitsfield..	S. P.	W.	T.	95
O. G. Carpenter, Cambridge	U. S.	W.	A.	97½
C. H. Cobb, Westford.....	D. L.	W.	A.	94
J. A. Gallup, W. Woodstock		W.	W. R.	95
J. H. Pierce, Franklin.....				93
T. H. Lyster, St. Johnsbury.	D. L.	G.	A.	95
A. E. Sherburne, N. Pomfret	D. L.	W.	A.	94
P. W. Leonard, N. Pomfret	U. S.	W.	A.	93
H. B. Leonard, N. Pomfret	U. S.	W.	A.	93
S. H. Warren, N. Pomfret..	U. S.	W.	A.	93
R. S. Wetmore, Pittsford...	Emp.	W.	A.	91
H. S. Eldred, Sheldon.....	D. L.	W.	A.	94
C. Gates & Sons, N.Hartland	U. S.	W.	A.	94
S. H. Wright, Stowe.....	D. L.	W.	W. R.	93
N. Bigelow, Stowe.....	D. L.	W.	T.	93
F. Teer, Clarendon Springs.	U. S.	W.	W. R.	92
W. N. Hill, Starksboro....	U. S.	D. C.	A.	95
J. R. Hayes, Strafford.....	D. L.	W.	A.	94
E. S. Howard, W. Hartford	D. L.	W.	W.	94
C. A. Choate, W. Barnet....	D. L.	W.	A.	97
J. N. Blair, W. Barnet....	D. L.	W.	A.	93
W.F.Cunningham, St.Albans	D. L.	W.	A.	94
M. H. Miller, Pomfret.....	D. L.	D. C.	A.	95
F. L. Davis, N. Pomfret....	D. L.	W.	W. R.	95
J. D. Hewitt, N. Pomfret..	D. L.	W.	W. R.	92
Julius Converse, Middlesex	U. S.		A.	93
C. D. Hazen, Wilder.....	D. W.	W.	A.	93
R. Cossingham, Jr., Norwich	U. S.	W.	T.	92
C. D. Martin, E. Corinth..	D. L.	W.	W, R.	93
L. B. Page, Randolph Ctr..	U. S.	W.	A.	94
A. G. Sawyer, Topsham....	D. L.	W.	D. C.	95
C. H. Crofut, Arlington....	D. L.	W.	C.	95
F. E. Holmes, E. Brookfield	U. S.	W.	W. R.	94
C. J. N.Shackford, E.Ryegate	U. S.	W.	A.	93
A. J. Wescott, W. Rutland..		W.	A.	93
J. H. Chapman, Clarendon Springs	D. L.	W.	A.	94

M. H. Ridlon, Clarendon Springs	D. L.	W.	A.	94
C. F. Stafford, Clarendon Springs	D. L.	W.	A.	94
G. C. Bean, Coventry.....	D. L.	W.		95
Ernest Hitchcock, Pittsford	D. L.	W.	A.	96
J. B. Candon, Pittsford....	D. L.	W.	A.	94
Chas. LePage, Barre.....	Shp.	W.	W. R.	93
W. G. Fassett, Enosburgh..	U. S.	W.	W. R.	95
Wm. Chapin, Middlesex....	Gravity	W.	W. R.	94
J. R. Whitchee, S. Ryegate..	Emp.	W.	A.	93
E. A. Stone, Brookfield....	D. L.	W.	T.	92
S. M. Jewett & Sons, Middlebury	D. L.	W.	A.	93
F. B. Dutton, Woodstock...	U. S.	Dc.	A.	92
G. W. Terrill, Morrisville..	D. L.	W.	W. R.	91
C. F. Smith, Morrisville....	D. L.	W.		93
W. W. Webb, E. Barnard...				94
A. P. Clifford, N. Pomfret..	U. S.	W.	A.	94
J. A. Burbank, N. Pomfret	U. S.	W.	A.	95
C. D. Smead, W. Brookfield	D. L.	W.	A.	91
Hewitt & Moore, N. Pomfret	Emp.	W.	W. R.	92
N. H. Ricker, Ryegate.....	D. L.	W.	A.	95

CREAMERY CLASS.

<i>Name and Town</i>	<i>Separator</i>	<i>Salt</i>	<i>Color</i>	<i>Score</i>
E. L. Howe, E. Barnard....		W.	W. R.	94
John Campbell, N. Thetford	D. L.	W.	W. R.	91
W. R. Micott, Brattleboro..	C. C.	W.	A.	93
W. C. Donahue, Monkton..	D. L.	W.	A.	92
E. E. Symes, Ryegate.....	U. S.	W.	A.	97
Donahue Bros., Hinesburg.	D. L.	D. C.	A.	91
W. V. Beach, Charlotte....	D. L.	W.	W. R.	97
Sewall & Fowler, Royalton..	D. L.	W.	A.	94
H. W. Belden, Waitsfield..	D. L.	W.	A.	95
A. A. Stores, E. Bethel.....	D. L.	D. C.	A.	95
G. W. Strong, Oakland....	D. L.	D. C.	A.	92
H. O. Whitney, Williston..	D. L.	W.	W. R.	94
E. C. Hillis, N. Montpelier..	U. S.	W.	W. R.	94
F. A. Bellows, Panton.....		W.	A.	95
F. R. Whitelaw, Randolph..	U. S.	W.	W. R.	91
J. N. Vassau, Westminster..		W.	A.	91
H. C. Bruce, Sharon.....	U. S.	W.	A.	96
W. P. Stone, Strafford....	D. L.	D. C.	A.	95

J. A. Leary, Jericho.....	D. L.	D. C.	A.	93
A. L. Harris, Proctor.....	D. L.	W.	A.	97
F. W. Ellis, S. Corinth.....	U. S.	D. C.	A.	94
L. B. Dodge, Barre.....		D. C.	A.	93
F. B. Milligan, Walden....	D. L.	W.	A.	95
W. G. Newton, Colchester..	D. L.	Col.	W. R.	97
W. G. Simpson, Waterbury Center	D. L.	W.	A.	94
B. F. Warner, Burke.....		D. C.	A.	93
L. W. Seaver, Washington..	D. L.	W.	A.	96
F. E. Wells, N. Randolph..	D. L.	W.	A.	94
H. H. Carpenter, Cabot....	D. L.	W.	A.	96
C. C. Fuller, Jonesville....	D. L.	W.	A.	96
W. B. Leonard, Barton Land- ing		D. C.	W. R.	93
D. H. Hackett, Albany, Vt..		D. C.	W. R.	94
H. D. Chamberlin, McIndoe Falls.....	U. S.	W.	A.	96
H. B. Bailey, Coventry....		D. C.		95
J. F. Donahue, Vergennes..				94
A. L. Lewis, Rochester.....		W.	A.	94
B. H. Brown, Waterbury....		W.	W. R.	95
Palmer Brothers, New Haven	D. L.	W.	A.	93
John Bond, E. Montpelier..	U. S.	W.	A.	93
W. L. Parsons, Waitsfield..		W.	A.	94
F. W. Montgomery, Barre..	U. S.	D. C.	A.	96
L. W. Smith, N. Danville..	U. S.	W.	A.	98
W. E. Jackson, Warren....				94
Miss Hanna Holonen, Wards- boro	D. L.	W.	A.	96
D. O. Ryan, Orwell.....	U. S.	W.	A.	95
W. Burton Millard, Newfane		W.	A.	96
O. D. Sampson, Enosburg Falls		W.	A.	94
B. A. Hatt, S. Ryegate....	U. S.	W.	A.	96
F. A. Cree, Plainfield.....	U. S.	W.	A.	96
J. F. McLam, Topsham....	U. S.	W.	A.	96
Arthur Johnson, E. Ryegate	U. S.	W.	A.	94
W. S. Lackie, Marshfield...	U. S.	W.	A.	93
C. C. Lawless, Montpelier..		D. C.	W. R.	94
C. L. Somers, Groton.....	U. S.	W.	A.	94
G. M. Hayward, E. Corinth	D. L.	W.	A.	97
A. R. Hayward, Topsham..	U. S.	D. C.	A.	94
E. M. Slack, Woodstock....				92
W. L. Fish, Bethel.....				93
F. B. Nelson, W. Salisbury..				91

CHEESE.

DAIRY PLAIN.

Score

J. C. Oliver, West Charlestown.....92

DAIRY SAGE.

J. C. Oliver, West Charlestown.....92

FACTORY PLAIN.

Palmer Bros., New Haven.....95

H. W. Rice, Westford97

F. G. Stone, Dorset.....96

FACTORY SAGE.

H. W. Rice, Westford.....98

F. G. Stone, Dorset.....95

Palmer Bros., New Haven.....94

Explanations.

D. L. DeLaval Separator.

D. C. Diamond Crystal Salt.

U. S. United States Separator.

C. Colonial Salt.

Emp. Empire Separator.

A. Alderney Butter Color.

Am. American Separator.

W. R. Wells, Richardson &
Co., Butter Color.

Sh. Sharples Separator.

T. Thatcher's Butter Color.

S. P. Small Pans.

W. Worcester Salt.

C. Caroline Butter Color.

Judges, { ORIN BENT,
 { G. L. CUSHMAN, Boston.F. L. DAVIS, Secretary,
North Pomfret, Vt.

Five samples of butter and one of cheese are left out, did not score up to the standard.

Mr. President:—Of course you have noted during the reading of this butter score that we have some very fine butter in Vermont, and now I want to introduce to you a man who has had experience in making fine butter. It gives me great pleasure to introduce to you Mr. J. G. Turnbull of Barton Landing, who will speak to you on the cream gathering system vs. milk.

J. G. Turnbull said:

CREAM GATHERING SYSTEM vs. MILK.

It is with considerable diffidence that I stand before you at this time to discuss the subject assigned me. I fully realize that I am out of place, for, though I feel abundantly able to argue the question with the farmers individually or even in small groups,

it is altogether a different matter to stand before a body of representative men who are more able and better qualified to handle this subject than I. However, as our Secretary has gotten me into this predicament, I hope you will bear with me, and blame him only.

This subject, Cream Gathering vs. Milk, has occupied so prominent a place in the papers of late, it does not seem as though anything new could be offered, but I hope that I may say something, however slight, not heretofore brought out. Before going further, I will state that I realize that anything I may say in favor of the cream gathering system will not meet with much favor with the Boston butter men present. In fact, as far as I can learn, they are all (I might say to a man) opposed to the system.

But to use the words of a former President of the United States during his first term of office, when the tariff seemed to be attracting more attention than it seems to at the present time, and, by the way, not any more than the deficit in the United States Treasury, "It is a condition, not a theory that confronts us," and however much we may argue and work against it, the fact still remains that cream gathering from hand separators has come to stay.

The farmers are very scarce, indeed, who will go back to the whole milk system after they have tried the cream gathering system, unless they live very near the creamery, or have extra large dairies, and, in my section, they will not even then. They simply will not deliver milk to the creamery. This, at least, is my experience.

I will not try to enumerate *all* the advantages and disadvantages of the system, as they were discussed so thoroughly by Prof. Hills at our meeting last year.

It is almost needless to say that the great objection the farmers have to the whole milk creamery is the time spent in delivering the milk, and this is a great objection, indeed, now, when farm help is so scarce and wages so high. In almost a majority of cases it means the loss of nearly one-half a day every day delivering the milk to the creamery. They much prefer to have the cream gatherer call regularly and take the cream at their door.

There have been started in my county, twenty different creameries and skimming stations (mostly creameries) taking in whole milk. Some of these were started by myself, and only one is taking in whole milk today. All in the county are strictly gathered cream, with the exception of one, and that one is taking in more cream than milk.

Perhaps you will say that I have encouraged the cream gathering system, and discouraged whole milk. I will assure you this is not the case. We have never taken out a power separator from one of our creameries as long as we could get milk enough to run it, but have continued to run the separator until long after it ceased to pay.

The last creamery we bought was originally a whole milk creamery, and run as such for years. There probably was not a hand separator in town for years after the creamery was built. It seemed to be an ideal location for a whole milk creamery, as it was located in the center of the town, making the trips comparatively short for almost every one.

This creamery changed gradually to cream gathering, so much so, that the first month after we bought it, we paid the farmers for 17,414½ lbs. of butter fat from gathered cream, and only paid them for 2,594 lbs. of butter fat from milk delivered. This in spite of the fact that both of the former owners of this creamery were in favor of whole milk creameries, and did all possible to discourage the change to gathered cream.

But I will go outside of my own county. The Franklin County Creamery Association, which for many years was the largest creamery in the world, originated as a whole milk creamery, taking nothing but milk. Today a large part of the product, so I am informed, is made from gathered cream.

Look at the great West that changed so fast years ago from cream gathering, from deep setting shot gun cans, to whole milk creameries, the last few years changing a good deal more rapidly from the whole milk to the gathered cream creameries and hand separators. It is just possible, however, they are going too far, or too fast out there with their centralizing plants. If so, without doubt this will be regulated later.

It all goes to show the trend in this direction, and that it is a *condition* that we are up against. It is not which shall it be, cream gathering or whole milk, but, as the cream gathering system is becoming fast an established fact, shall we merely deplore this fact, or shall we make the most of it?

Now, the objection to the cream gathering system our Boston friends will tell us, is the poorer quality of the butter produced, and they perhaps have good reasons for their objection.

We find in our experience that *one* of the reasons for poorer quality of butter is that at least some separator agents, in their anxiety to sell separators, will make the farmer believe they require almost *no* care. The consequence is that too many of the separators are not kept as clean as they should be.

Also there has not been pains enough taken by the different creameries to instruct the patrons how to take care of their

cream. For instance, I have in mind a creamery that failed last summer in our section. After the failure the business of that creamery to a large extent came to us. We found there were a great many of the farmers that had never been instructed how to take care of their cream after it was separated. One man told me that he had never been informed that he should not mix the newly separated cream with the older cream. Neither had he been told *not* to keep the cream covered air tight. Both of these he had always practiced.

The one great trouble with us as creamery men is that we are too anxious for business, and do not reject as much cream or *milk* as we ought. (I say milk, for this will apply to whole milk creameries as well as cream gathered creameries). Nor do we take the pains to inform them and let them know what is expected of them.

They should understand that the best butter cannot be made from thin cream, and I will say in this connection, that great credit is due Prof. Hills for advocating and insisting that all buttermakers weigh their cream test samples, instead of measuring as formerly. He has had his hands full, but he now has the satisfaction of knowing that a large majority of the creameries of the State at the present time, I think, are weighing their cream samples instead of measuring as heretofore.

Possibly you will say, what has this to do with thick cream? It has this to do with it. You cannot do justice to those patrons who have thick cream if you measure the cream test samples, instead of weighing them, for they will soon adjust their separators to run thin cream, with the result that many more will have thin cream, which, without doubt, affects the quality of the butter.

We practiced for years, while we were measuring samples, adding extra on a sliding scale to those that had thick cream. This, of course, partly made up for the inaccuracy; but not wholly. The only proper way is to weigh them, and, by so doing, do justice to all, and encourage thicker cream, and a tendency to a better quality of butter.

And right here, I must admit that we have a bigger problem in the cream gathering than in the whole milk in this one particular: In taking in milk, if it is a little off (which of course can be very easily determined the instant the cover is removed) and is rejected, they will not find much fault, for by the time they get it home, creamed and churned, it will be decidedly off, if they ever do cream and churn it.

Whereas if the cream is off, and is rejected, they will churn at once, and consequently have a better chance to make fairly good butter. Then they will tell you how much they got for this butter at the store.

This cream that was rejected perhaps was only a little too sour, which, though it would be considered a serious objection for creamery butter, would not, of course, be considered nearly as serious in dairy butter, consequently would sell all right at the stores.

We have made a practice in our business of sending circular letters occasionally to our creamery patrons reminding them how to take care of their milk, cream after separating, the separator, etc. We find this has helped wonderfully. Also have sent men around to each farm to make a thorough inspection. This last has done more good than all else combined. We get right after those who do *not* take care of their cream, and the others (I am glad to say the large majority) who *do* have good cream are pleased to know that we are trying to have *all* the cream as good as theirs. And they appreciate our efforts.

There is one advantage the cream gathering from hand separators has over whole milk, and strange as it may seem, this advantage has to do with the quality. In the winter when the amount of milk is small there is a practice at some whole milk creameries of only taking in milk every other day. Now, which is preferable, especially when the stable and cows are not as clean as they might be, and where the milking is not done in as cleanly a manner as it should be, to let the filth stay in the milk more than twenty-four hours to steep, or run this milk immediately through a hand separator?

I have a buttermaker friend who told me about two years ago (and who at that time received whole milk only) that it was impossible for him to make good butter in the winter. He took in milk only every other day.

Is it not possible that if the milk had all been run through hand separators as soon as drawn from the cow, instead of holding the milk two days before delivering, that the quality of his product would have been greatly improved?

I have been wandering all around talking on both sides of the question, whereas I suppose I should advocate the cream gathering side only, as I am a firm believer in it, but I realize that there is much to be overcome. And while we are trying to educate (I am glad to say) the minority of the farmers who do not take proper care of their separators, cream, etc., let us look to ourselves and see if we are scrupulously clean in every particular in and around the creamery. This is of the utmost importance.

How can we expect the farmers who may not all be naturally inclined that way to do as we wish to have them, and furnish good cream, if we do not show them we are in earnest by taking the utmost care ourselves? So let us all do everything in our

power to overcome the prejudice which the butter men at our great markets have for gathered cream butter.

The President:—The discussion will be opened by Mr. C. F. Eddy of Stowe.

C. F. Eddy:—Mr. President, gentlemen and members of the Vermont State Dairymen's Association. I have no set speech in regard to this matter. One thought I have in regard to it was brought to my mind by the last speaker. Now there are good things in regard to the cream gathering system, but, sir, and gentlemen, I believe that they are more than overcome by the bad things. I do not believe, as the gentleman has said, that it is possible to make as good a quality of butter from cream which is gathered in the ordinary manner, in the State of Vermont, as it is to have the whole milk come to the factory. Where the cream is needed is in the butter making station from the time it is separated until it is gathered into the product; where all the sanitary arrangements should be of the best. I know it has been my experience with cream gathered in the creamery that I was not able to pay the patrons of this creamery, on account of the quality of butter which I produced, as much per pound as I could from the whole milk creameries.

Of course it is very nice to have the cream gatherer come around and take the cream from your door, that is a very good feature which is referred to in Mr. Turnbull's paper. But there are other features beside that. I ran creameries in Orleans county for two or three years. It is a fact that my patrons of the other creameries got from a cent to a cent and a half a pound more for their butter than in Orleans county.

Suppose you make 300,000 pounds of butter a year in your creamery and at another creamery your patrons would get a cent a pound more than you pay, they would lose \$3,000. Now, gentlemen, can we explain it? I understand how the matters Mr. Turnbull has spoken of come about in regard to the change from whole milk to cream. Some patrons have become dissatisfied in some creameries. They say, I will have a separator, I won't take my milk to Mr. Smith's creamery; I will have a separator; I will either make my own butter or go to Jones' creamery and I can carry my cream once, twice or three times a week (it is usually once). We wont carry to this man any more milk, so Mr. Jones hears of this and he says, well, there is a nice chance to work in with Mr. so and so; I will give this man a little more than his stuff tests; I will draw from Mr. Smith's patronage over there, and he does it. The result is Mr. Smith goes over there and he makes, perhaps, more than he could at the other creamery. He tells his neighbor; the neighbors work into the same arrangement; they get a separator. I be-

lieve when they do that thing they do it to the disadvantage of themselves. I know it to be a fact.

The gentleman has spoken about the commission men in Boston. Commission men are good fellows; they are all right if you make good butter enough so they can sell it to the consumer, but you can't do it under the cream gathering system. I have tried it. I have been in this business twenty-one years. Now, gentlemen, the gentleman has told us he thinks we could make better butter in winter from the cream gathering system than we can with the whole milk system. Now I do not coincide with his views. I believe that where you have a cream gathering system the customer does not take very much better care of the cream than he does of the milk. The cream is kept in almost any old place ordinarily, and I will say right here that is the worst condition of things that can possibly be had.

The trouble is with the creameries of the State of Vermont, they are too anxious for business, they are too anxious to get cream. Why, sir, I have had creameries where my team has been over a route where Mr. A has been over the same route, Mr. B has been over the same route and we were all out for business.

If a patron's cream is not quite right and you go to him and ask him to take particular care of it in the proper way, probably he will be very sorry and promise to do everything you ask him to, but the chances are that in a week you will have to go to him again and he will say, oh, yes, I will take care of it, and perhaps he does for a little while longer. Then he commences to get back to the old way and if you speak to him again he gets a little sore and perhaps you get a little sore and angry and finally he will say, "If you don't want my cream Mr. A or Mr. B will take it every time." That is the situation that confronts the creamery man in the State of Vermont today. I believe it is a bad condition to get into, and the farmers in the State of Vermont are the people who suffer for it, not the creamery. We get three cents a pound for making your butter (or two and a half cents, whatever we charge), no matter whether it is good butter or poor butter. You bring your poor cream, we make the butter, we get our pay for making it and we are supposed to give you the balance.

I guess there are a few farmers here, and I will say right here I believe that nine-tenths of the creamery men in the State of Vermont are skilled, honest men. I believe you do get what belongs to you, but I do not believe, as I said before, in using the cream gathered system. I believe it is taking dollars out of your pockets. The agent comes around and says, "Why, buy a separator!" and he will make you believe that is the thing

to do, but now, I tell you when you do it you are taking dollars out of your pocket, you can not get something out of nothing; it is impossible to get more out of your milk at home than it is possible for the creamery to get out of it. You cannot get blood out of a stone. There is just so much in it, there is no more and no less, the creamery can get just as much out of your milk as you can get out of it and nine time out of ten he can get more because he makes a closer separation of the milk than you. Now, gentlemen, this is the way I feel about this matter. I do not see where there is one argument in favor of the cream gathering system in the State of Vermont today.

Applause.

F. L. Smith: Ladies and Gentlemen.—I was brought up to run a milk creamery. I was very loath to change to a cream gathering system and, in fact, I did not change until I was obliged to change or go out of business.

Formerly when my butter went to the market there would come back a letter saying your butter is very nice or very fine, or O. K., something of that kind, and since we have been on the cream gathering system there has not been any change in the tone of the letters from the Boston dealers. Now, I am as firm a believer today in the cream gathering system as Mr. Turnbull says he is. I believe it has come to stay. Whether we like the condition or not we have got to accept it, and I have strong belief that I can make as good butter under the cream gathering system as I could under the milk system; it is my experience, and I have had a very long experience in this line. What experience I have had has been in favor of the cream gathering system. I have churned this gathered cream, the cream mixed with the milk, and I have churned it separately, and I do not see as there is any change in the butter. If we would educate our patrons to keep their cream in good shape, I see no reason why as creamery men we cannot make as good butter under the cream system as under the whole milk.

We do not always get cream in as good shape as we ought to, neither have we always got milk in as good condition as we ought to, but I believe the cream gathering system is equal to the milk creamery. That is my firm conviction and as I said and as Mr. Turnbull has said, the cream gathering has come to stay and I for one am glad of it.

Mr. Smith:—I would like to ask Mr. Turnbull if he has ever had any experience in trying to separate the cream?

Turnbull:—I have never had any experience in that way. It has been suggested to me by some of my patrons, and I have been considering that for some time; it was suggested to me by one farmer not long ago that all the best cream be kept apart

and sold apart; the poor cream be kept apart and sold apart. We do that to a certain extent always if we have a little poor cream come in, but his idea was to draw a line in the factory, have part on one side and part on the other. I told him I did not think it was possible. If all was very good and very poor it could be easily done, but the middle class, it would be hard to tell where to put it.

I agree with a good deal that Mr. Eddy says, but not wholly. His experience that he can get a cent or so more a pound for butter made from milk instead of cream gathered is different from most of us.

As for the butter being so very poor, perhaps there is a difference in how one gets at it. You have too long routes and are bound to get cream, you go into a new section and try to work up business, the farmers think anything will do and you are possibly to blame in some cases. I think if you would have your routes and have your farmers understand you want the best, I think then Mr. Eddy's remarks would not apply, perhaps.

Mr. Adams:—Did I understand you to say when you got exceedingly poor cream you kept it separate?

Turnbull:—Yes.

Adams:—What do you do with it? Have you got customers for that butter?

Turnbull:—Yes, yes, there is always a sale for any kind of butter or anything. When you come to that, there is a sale for anything, at a lower price.

W. E. Jackson:—I have found, so far as my own experience is concerned that with the gathered cream system I can make as good or better butter if properly taken care of than with the whole milk and I will tell you why: Our farmers are not careful when they milk their cows. I have scored 98 when I had nothing except gathered cream butter. Today perhaps it is half gathered cream and perhaps it is half milk but I do not think that I can put my butter in a place that will score up to the best previous year, and the reason why is they are not careful enough either of the milk or cream. Many farmers think they can get more out of it by separating their own cream than they can to take it to the creamery.

A Member:—I would like to ask the gentleman who said he got as much for his butter whether it was made from the gathered cream system or the whole milk, where he ships his butter, whether it goes to the grocery trade, the hotel trade, or whether he ships it to a commission house?

Mr. Smith:—I am shipping my butter to a wholesale Boston dealer.

Mr. Blood:—I have not had the experience Mr. Turnbull or Mr. Eddy have in regard to making butter or cream from milk.

I have had experience in separating my cream and also in using whole milk. There are two things these gentlemen have brought up here, they say, or one of them says, you can get more cream from your milk if you take it and separate it at home. I want you to think just one moment; don't you know there is a mechanical loss in the separation of milk; are not you aware that there is more of a mechanical loss in a small amount from several machines than from one machine?

I want to ask if you realize and of course you do that cream can become contaminated with outside surroundings quicker than milk? Mr. Waterhouse, one of the greatest butter makers in New England said that cream would take bad odor the quickest of any known thing, milk cannot take it as quick as cream. I do not cast any reflection upon Mr. Turnbull or Mr. Eddy or any man who runs a creamery, but there is another thing you farmers want to understand if you separate your milk and send cream to the creamery, because there is more in the cream for the creamery men than there is in the milk. Creamery men would rather handle cream than milk. You have seen the time when one gold dollar would buy more goods than paper ones and cream will bring more sometimes than milk, to the creamery man.

I tell you that every time you bring cream to the cream gathering creamery you farmers have got to pay the bills, no creamery man is going to give you anything. You look at it. You have got to have a separator and other machinery and just as sure as you live you have got to pay for it. It is easier for you farmers to pay for a creamery kept on the milk system than on the cream system; you can make a better quality of butter, and a farmer than can not take good care of his milk, how is he going to take good care of his cream and separator?

Mr. Turnbull:—With all due respect to Mr. Blood I take issue upon that point that we had rather have cream than milk, and you say we make more money on the cream. I think it is the other way. I would be glad not to take any cream whatever if it all came in milk, and do away with the team, but you cannot do it.

Ira E. Hunt:—Right in connection with what is being said about milk being delivered to the creamery and the gathered cream system; I am fully aware that the gentleman that gave us the paper is confronted with the same thing that we are at our place. We started four years ago, in a modest way, a creamery with one out-station, with no desire to enlarge our business, started and organized under a co-operative plan to make our

own product. The result is we have done business for four seasons. This last season 2-3 of our business has been gathered cream. The farmers in our section will not take the time to take their milk and send a man to us, they had rather own their separator and we send a team and gather the cream, and we have so far experienced no bad effects from the butter we have made. We have taken great pains to go around among the farmers and see that they take care of the cream. I take exception to the statement that a man cannot take care of his cream as well as his milk. The farmers will not bring their milk to the station and we have got to do the next best thing and that is to gather their cream and educate them up to taking care of it. That is the best we can do.

J. A. Gallagher:—I take it only fair that Mr. Turnbull should give us the reason why he is compelled to make butter from the cream gathered system rather than from milk. The farmers in Orleans compelled all the creameries to make butter from cream. We have had experience the other way; of bringing milk to the creamery, and the farmers insist upon having the creamery send a team to collect the cream. That was the condition of our locality and I presume it has been so in others.

Mr. Turnbull:—I will say that when I had my first creamery, 14 years ago next March, it was a cream gathering creamery, had been run three years, one year as a milk creamery and the rest of the time as a cream gathering one. I theorized a little—had not had much experience—wondered if it was not possible to start that creamery as a milk creamery. I went around and I could not get a single person to deliver milk, I was obliged to start into cream gathering. What experience I had had in the butter business was in a cream gathering creamery in the town of Glover. I tried to start a milk creamery and could not do it, so I was compelled to take up the other.

A Member:—Do you know any farmers that would go back to the other system?

Turnbull:—They would not.

Mr. Fish:—I am not going to discuss this cream question. There is one point on which there has been nothing said. The great point is that the farmers where they lose the most in their separators is that they let little John run the separator in the morning and then little Julia will run it at night, some of the time they run it slow and some of the time they run it fast; they lose a lot of cream in the skim milk. That is one of the worst things we have to contend with. You have got to keep up the speed to get the cream.

Mr. Eddy:—Some one asked Mr. Smith a while ago what he did with his butter and I think he said he sold it to a com-

mission house in Boston. That is all right, but the commission men in Boston and all over New England are out for business and some of the creamery men are out for business, they will take anything you send to them and say it is all right, they get their commission.

A Member:—I have been in the creamery business for the last 20 years, and had, probably, the same experience Mr. Eddy has, my last four years has been mostly with the gathered cream. Half a dozen Boston men handled my butter for fifteen or twenty years, but in the last three or four years they have kept asking what the trouble was with our butter that there was such a big difference. Give me the whole milk for all the cream gathered.

Secretary Davis:—I think one important reason why farmers prefer the cream gathering system and having their milk separated at home is because the sweet milk is so much better for their calves and pigs than it is when it goes to the creamery and mixes with everybody's milk, in hot weather it is sour before they reach home and it is not as good for our calves and pigs.

Mr. Smith:—Mr. Eddy spoke about sending butter to a commissioner. I do not sell my butter on commission, my butter is contracted on a basis with the Boston markets, and I know beforehand just what I am going to get for my butter.

Mr. Turnbull:—I agree with the other gentlemen about separators not being run as they ought to be, but there is another thing that must not be lost sight of and that is that your separated milk is in the best condition possible; that makes up some for the loss of cream by the different speed of the separator.

Blood:—Just a word. I do not believe that any of us want to misrepresent anything and it is reasonable to think that both sides are right to a certain extent. There is no manner of doubt but what in certain localities the cream gathering system might be the best under all conditions for the farmers in that locality. On the other hand in another locality the whole milk system is better and more beneficial in that community, see? We do not say the cream is the best to make butter from, under the cream gathering system, because it is not.

Jackson:—Let me inquire of Mr. Blood if he ever knew of a cream gathering system that went back to the whole milk system?

Blood:—I will answer that in Sullivan county in the State of New Hampshire Mr. N. G. Williams, secretary and treasurer of the Vermont Farm Machinery Co., told me there was a creamery built in the town where he lived about 21 years ago, it was built on the cream gathering system, with the old Cooley can,

deep setting and it was changed to a milk creamery. The creamery today is doing good business.

Mr. Eddy:—I know another in South Newbury.

A Member:—I have had ten patrons who laid the separator one side and went back to whole milk.

The President:—We have with us today a professor from Amherst college, and I am very glad to introduce to you Prof. F. S. Cooley of Amherst, Mass.

Prof. Cooley:—Gentlemen of the Vermont Dairymen's association and ladies:—I assure you it is an honor to be invited to address you at this time which I doubly appreciate, but it seems a pity to interrupt a discussion of this kind for what I may have to say. I realize that these men who have been speaking come from your own locality while I am a stranger whose only connection with agriculture is that I am a professor in an agricultural college, although I have owned a few cows, re-tailed milk and separated some cream but it was only a side issue. My work in the college has been in connection with animal husbandry instruction, and especially with cattle and cows which are most interesting objects to me and I have selected for my subject

THE HUNDRED DOLLAR COW.

This subject naturally suggests the question, what is a hundred dollar cow? Are there cows for which farmers can afford to pay \$100 for dairy purposes? Is the hundred dollar cow a far off ideal or a living reality?

In reply let me call attention to certain facts from which you may make your own deductions: The average cow for the entire country, according to figures obtained by the late Henry E. Alvord, produces about 125 pounds of butter annually. My canvass of Mass. creameries leads to the conclusion by the fore-mentioned authority that Massachusetts cows are somewhat better than the average for the United States, and that the average annual butter product is about 175 pounds per cow. Average milk would require about 1,750 quarts or a little more than 3,500 pounds to produce 175 pounds of butter. The value of the product would be about as follows:

175 pounds butter at 25c.....	\$43 75
1,500 quarts of skim milk at 1/2c.....	7 50
	<hr/>
	\$51 25
Or 1,750 quarts milk at 3c.....	\$52 50

These prices for the product are rather high for a five year average; but if we take the present prices for feed the comparison will be fair.

20 weeks' pasture at 40c.....	\$ 8 00
2 tons hay at \$12.....	24 00
1 ton stover at \$6 or 2 tons silage at \$3.....	6 00
½ ton grain at \$26.....	13 00
	<hr/>
	\$51 00

This may be considered a fair amount of feed for an average cow and the cost is in keeping with present times and prices for milk and butter. It is apparent that with average cows the margin of profit is small and there is very little compensation for the management and labor expended, and very little hope of lifting the mortgage from the farm by their agency. This will be realized with still greater force when we remember the 6 per cent. interest, the taxes and the depreciation of the plant, requiring to be frequently offset by expense for repairs and renewals, and other incidental items not considered in the mere feeding of cows.

The average cow is not then a bonanza, and will never contribute materially towards lifting the mortgages from our New England farms.

But there are cows much better than the average; cows that produce much more milk and butter and pay a handsome profit above the cost of their maintenance.

PIETERJE II.

A Holstein Friesian, is reported to have given 30,318½ pounds of milk in one year, or about 14,000 quarts; an average of almost 40 quarts daily for the entire period. Think of it farmers, when you have to strip four or five cows to get a pailful, of milking four pails full a day for a full year from one cow. Just about the product of ten average cows.

PAULINE PAUL.

Another Holstein Friesian, is said to have produced 1,154 pounds of butter in a year.

PRINCESS II.

A Jersey, is recorded with 46 pounds of butter in seven days, which if true, would be at the rate of over two thousand pounds per year.

There are several records, well authenticated however, of cows producing from 25 to 30 pounds of butter in seven days,

and quite a number have demonstrated their capacity to produce from 500 to 1,000 pounds of butter in a year and from 10,000 to 20,000 pounds of milk.

These are, however, the records of individuals, of which the number is too limited to cut a large figure in the total dairy product. They bear much the same relation to dairy cows in general that millionaires do to ordinary men of business, or presidents and senators to common people. Without depreciating high standards, we must rather set our aim at high averages for whole herds year after year, than occasional phenomenal performers.

It is well within the possibilities of good dairying to secure herds of cows that will average to produce from 300 to 400 pounds of butter per year or 1,000 to 1,800 pounds of milk. I make it a rule to reject all cows that are not capable of producing 300 pounds of butter per year, and most always have one or two that go over 400 pounds. This is about double the average product, and the profit increases very rapidly beyond the point of barely meeting expenses. The cost of keeping between the 400 pound and the 175 pound or average cows is not very different; not nearly as much as the value of the product.

Prof. Beach, of Storrs, Conn., found that the cost of feed of 16 cows in 1899, when feeds were much lower in price than at present, varied between \$36.71 and \$48.80, or about one-third, (33 per cent,) while the product varied in value between \$50.04 and \$91.62, or over eighty per cent. Moreover the cow making the smallest product did not consume the least food; but was slightly above the average in cost of feed. It cost less than two dollars more to feed the most profitable cow, earning an annual profit of forty dollars, than to feed the least profitable cow earning a profit of only seven dollars.

It will, doubtless, cost a little more to feed the higher class cows than those of only average merit; but most of the difference in their product is clear profit.

We have shown conclusively, I think, that there is a difference in cows. That some are average and do little more than pay expenses; while others earn a handsome profit.

The next question that I wish to propose is what is the difference in value between the average and the high class cow? I have proposed a basis of valuation that has in it some ideas that are original in the sense that I have never found them elsewhere, and which may be new to some of you.

An old basis of valuation was the annual product, i. e., a cow is worth the value of her annual product. The basis which we wish to consider has to do with profit rather than product, and is as follows:

A dairy cow is worth in addition to the value of her carcass, the sum on which her annual profit will pay

6	per cent interest
2.3	" " taxes and insurance.
25	" " depreciation

33.3 per cent, total.

Business men will generally agree that the first two figures amply cover the items which they are set against. The 25 per cent. depreciation means that a sinking fund is created which will in four years amount to the value of the cow above what her carcass will fetch. It pre-supposes the usefulness of the cow to continue four years. It is an average factor to be applied to cows as they are found on the market. It may vary with the individual, etc. A young heifer may have a prospective period of usefulness covering eight years' time, in which case the depreciation factor would be $12\frac{1}{4}$ per cent., instead of 25 per cent. On the other hand an old cow may be expected to be useful for only two years or perhaps only one, in which case 50 or 100 per cent. depreciation should be charged. 25 per cent. is then an average factor based on a four year period of usefulness.

It may be observed that this is an estimate rather than an actuality. We approximate but cannot be mathematically exact. For this reason it is desirable to be conservative and err on the side of moderation.

If this basis appears logical let us apply it to some of the grades of cows that are kept for dairy purposes with view to ascertaining their comparative values as dairy animals. This may be shown very readily in a tabular form as follows:

TABLE OF COMPARATIVE PRODUCTION OF COWS.

Kind of cows.	Annual pounds milk.	Value at \$50 per 100 lbs.	Cost of feed.	Profit.	Value in excess of carcass.
Poor.....	2,000	\$30.00	\$40.00	\$10.00	\$ 30.00
Average	3,000	45.00	45.00	00.00	00.00
Fair.....	5,000	75.00	55.00	20.00	60.00
Good.....	7,000	105.00	65.00	40.00	120.00
Choice	10,000	150.00	75.00	75.00	225.00
Pieterje IL.....	30,000	450.00	100.00	350.00	1,050.00

The comparison is somewhat startling, yet the figures appear to be based upon sound logic, and solid business principles.

Allowing \$25, as an average value of a cow's carcass, we may observe that in four years time the *poor cow* has sunk the value of her carcass and five dollars of good money when kept for dairy purposes.

The *average cow* has barely saved her entrance and is worth as much as her carcass.

The *fair cow* has paid an annual profit of \$20, and has made it possible to get back an original investment of \$60 more than her carcass is worth.

The *good cow*, earning an annual profit of \$40, repays an advance of \$120 above her beef value.

The *choice cow*, at \$225, is still as profitable as the average cow at nothing, provided their carcasses are of equal value.

Pieterje II has refunded to the tune of over a thousand dollars.

It may be that we have set a rather high valuation upon the product for this section. It will apply where the wholesale demand for milk is strong; but if we lower the value of the product, we make it still more unprofitable to keep poor cows; and still more necessary to raise the average standard to live.

Can the dairy farmer afford to pay the higher prices for the best cows? Apparently he will be just as well off to pay \$225 for a choice cow as to keep an average cow four years as a gift; but the market does not make so great distinction between the different grades. To view the situation from another point we may observe as follows:

The poor cow costs \$25 and we sink \$30 every time we buy her and keep her four years.

The average cow costs \$30, and if we can sell her even, we have neither gained or lost.

The fair cow costs \$35 to \$40 and leaves a small profit for the investment even if we are obliged to sell her carcass for very little.

The good cow costs \$50 to \$60 and returns a profit of \$120, besides interest and taxes in four years' time. We have doubled on our investment.

The choice cow costs \$75 to \$100 and is by odds the most profitable and satisfactory of them all.

Pieterje II at \$500 would return her purchaser a profit of more than half a thousand.

Is there any doubt about great difference in value of cows for dairy purposes? Is there any doubt that a cow returning an annual profit of \$75 for four years is worth a hundred dollars? were it possible for the breeder and dairyman to secure the hundred dollar grade every time, would not their profits be greatly enhanced?

One great difficulty in obtaining such cows is the uncertainty of the dairy qualities of cows on the market. They are not graded like corn or wheat or cotton, or even like beef stock, but vary very much and are sold according to the fancy of the buyer

and the persuasive power of the seller. If each cow could be rated and guaranteed at her annual milk or butter product, and sold under such a guarantee it would very much simplify matters. As it is there are two ways of learning or estimating the dairy capacity of cows.

First, by means of the scales and the Babcock test, and, second, by a careful study of her form and dairy points. It is unfortunate that so few dairymen know just what their cows are doing, and it is hoped that this may be the means of inducing many more to adopt methods of measuring accurately the capacity of their cows. When the seller can state definitely to the purchaser how much milk and what per cent. fat the cow offered has produced in a year, it will be a long step in advance of present market conditions.

As to dairy conformation and points, I rate the five essentials in the following order:

1. Udder, capacious, indicated by length and breadth of attachments.
2. Barrel, long, deep and roomy.
3. Pelvis, wide, roomy; hips and thighs of dairy type.
4. Head, neck and shoulders rather long, and spare-fleshed.
5. Superficial points, skin, hair, veins—escutcheon indicating dairy capacity.

If the dairyman knows that there are hundred dollar cows, and knows the features by which they may be recognized, he has progressed far on the road to securing them. The second part of this address deals with the question of obtaining the hundred dollar cow.

She must be tried because.

1. She is rarely met.
2. She is not recognized when met.
3. She is rarely for sale when recognized.

To breed the hundred dollar cow, begin with her grand dam. The breed is not essential so that it is a dairy breed. It is not important that she be purely bred, although she is produced by uniting similar qualities, for several successive generations.

The bull is half the herd is an old maxim in breeding. On the average where only ordinary care is taken in his selection, he is just about half the herd so far as influence over the qualities of his progeny are concerned. A bull of high character is an individual well developed, out of superior stock of the same kind for several generations, and prepotent in stamping his characters on his progeny may be nine-tenths the herd as a power for its improvement. It is not from your greatest cows alone that you are to expect the hundred dollar sort; but more often

the get of the ideal sire, out of typical ordinary cows, of the right sort will be found to produce the real thing.

The dam of the hundred dollar cow I should select for symmetry and general combination of desirable attributes rather than for extreme capacity in the dairy without the typical conformation. It is to the bull I should look mainly for superlative dairy excellence and for the source of that excellence in his progeny, yet the cows should be of the same kind of utility, differing merely in degree.

Cross breeding is uncertain business and is in the main largely responsible for the large number of weedy cattle found on the farms of New England. By cross breeding the inheritance is weakened, and a tendency to atavism is introduced, while by breeding like characters they become intensified. I should not attempt to increase the flow of milk in a rich Jersey strain by a Holstein cross, nor should I endeavor to improve the quality of Holstein milk by infusions of Jersey blood. Rather would I by selecting within a breed and its grades, of like animals improve them by mating with one like themselves in other respects.

Judicious selection of females and particular attention to the choice of the breeding bull will in the second generation produce the making of some hundred dollar cows. I should not scruple to breed a really meritorious sire to heifers of his own get. Indeed I should prefer to do so rather than to an unrelated bull of lower quality. Whether bred to their own sire or another male, care should be taken to preserve the characters brought out with so much pains and not change them with each change of bulls.

The development of dairy heifers is important for it is by development mainly that breeders have been able to improve upon the ancestry of their animals. The high dairy quality of certain breeds is explained in the cumulative development of these breeds generation after generation for a long period of time. This development must continue or retrogression sets in.

A few developments in the young prospective hundred dollar cow are to be noted.

1. Let growth be rapid and unchecked during calfhood.
 2. During heiferhood let the stomach and digestive organs be well distended with coarse fodders; but without prejudice to growth.
 3. Breed after a good degree of development, but free growth is finished and a fattening tendency appears; 18 to 21 months.
 4. Feed the young cow well after her first calf. She not only has to produce milk, but must also complete her growth.
- Finally a hundred dollar cow will look like thirty cents unless she is properly fed. A profit cannot be made from a cow

of this calibre any more than from the veriest scrub without feed. Her advantage is most apparent when under high pressure. Hundred dollar cows are not adapted to working on half time or half feed; and it takes a hundred dollar man to do the situation justice. Any fool can feed cows at low pressure; but it takes an artist to feed the limit. Very few people can hold a great cow to the limit and keep her there, one who does it proves his claim to the title of master.

Mr. Chapin:—Is not the rate per cent. of interest higher than common, 6 per cent.

A.:—I think a cow is just as good as a Government bond.

A Member:—Government bonds pay but $2\frac{1}{4}$ per cent. and savings banks 3.

Prof. Cooley:—Does anybody think I have got the per cent. too low, ought it to be seven or eight? My point is to make those things ample to cover everything. If a cow pays six per cent., I suppose that is all right.

A Member:—Seems to me you ought to start out with a herd of heifers.

Prof. Cooley:—Can't do that in Massachusetts, we sell herds as they run.

A Member:—Why does it cost \$75 to feed a choice cow and \$25 to feed a poor one?

Prof. Cooley:—It does not. In my figuring I was in every instance giving the poor cow the advantage. It does not cost \$40 more to feed a choice cow than it does the poor cow, I give the poor cow the benefit of the doubt.

A Member:—Do I understand you to say you have got to sell cows at the end of four years for the price you paid for them to come out even?

Prof. Cooley:—No, give them away at the end of four years and you would come out even.

A Member:—Do you think \$65 will feed the 30,000 pound of milk cow and make her produce the amount of milk the difference between the poor cow and the good one?

Prof. Cooley:—I certainly do.

George Aitkin:—May I say a few words along this line? I am very much pleased to have Prof. Cooley make his explanation so plain; that is, the difference between the good and poor cow. It is a fact that Vermont dairymen keep too many poor cows. The Professor did not go half far enough, in my estimation in regard to the good cow.

The value of a Pieterje calf is a great deal more than calves usually bring. For the past twenty years we have kept a strict account with all our cows, we weigh the milk, test the milk four times a year, and this last month I was making up the

pedigree of a calf, and I told my clerk to make out the record of this calf's mother and, while she is not the best cow we have, she has a record of 21 pounds a week, and for eight years she has given nearly 7,000 pounds of milk with a Babcock test of six per cent. Who shall say that the value of that cow's calf is not greater than that of a common cow?

As to the selling value of cows, if we keep records of them, as we should in our business, we will know pretty nearly what our calves are worth.

Prof. Cooley:—The point is well taken for this is just simply on the butter product; if a cow has a different value, is a stock cow, that is clear profit. Suppose Pieterje produces a calf every year, that adds to the profit and adds three times to the value. She becomes worth \$3,000 then.

A Member:—I want to ask you if you can get such a cow for \$1.050?

Prof. Cooley:—You can't get them for anything. You can't get them because they are not to be found. I made the point that one way to know a good cow was by seeing her milked. Very few people know what their cows do. In the first place the capacity of the cow is not known; in the second place if they knew they were good cows they would not be able to buy them, they would not be for sale.

A Member:—I want to ask you if it is not possible for a Vermont farmer to purchase a one hundred dollar cow with calf instead of waiting to develop a one hundred dollar cow? I mean go into a barn where the hundred dollar cows are sold, and buy a calf?

Prof. Cooley:—I have got one hundred dollar calves in my barn, but you can't buy them, they are not for sale. You can't buy the hundred dollar calf. That is the trouble all through Massachusetts. I have got a friend in Massachusetts who was called upon to address a farmer's meeting on how to get better cows, and he said to me, I am not a speaker, you write me something to read to those fellows, so I wrote this: "Don't sell to Ed. Williams your best cows, keep them to breed from and sell him your scabs and in ten years you will have all good calves."

President Bruce:—The time for adjournment has arrived. The meeting this afternoon will convene in this room at 1:30.

Wednesday P. M., January 11, 1905.

President Bruce:—The meeting will please come to order. It gives me great pleasure to introduce Mr. C. C. Gates of North Hartland, who will speak to you on "Private Dairying and Marketing Its Products."

It has been said by good authority that not every man can be a poet, any more than a sheep can be a goat.

Hence it follows that not every man can do justice to the subject that has been assigned him.

I have been asked to say something about the Private Dairy and the marketing of its products. We know the Creamery has done a good work during the past few years in bringing up the standard of quite a large per cent. of butter made in the State. Many farmers who formerly kept only a few cows, and poorly at that, and had so little cream and kept it so long, that when churned the result was an article *so* strong that a little went a long way, but brought a low price, have with the help of the Creamery, kept more and better cows, and realized a fair profit from them. For these farmers, the Creamery has been a great benefit. But many dairymen are so situated that it is not convenient to patronize the Creamery, and in many cases this is no misfortune. The time spent, or money paid for carrying the milk or cream to the Creamery, can very profitably be used in making our own butter.

Good cows are necessary to make a private dairy successful, and only such should be kept. A cow that will not pay for her feed and a fair margin beside, better be sent to the shambles, even if she looks well, and is well bred, but right here I would like to say that barring accidents, there are not many well bred cows that are a failure, but when one does turn up, sell her for beef, but *don't* let her go to anyone who wants her for a cow. You can't afford to do that, if there were no other reason. Great pains should be taken to get the best sire possible—one from a long line of good stock on both sides. Even if a liberal price has to be paid, he is worth it to the man who raises his own cows, as most farmers do. The surplus has to be disposed of and the standard must be kept up if one expects good prices for their stock.

Our farm is large, and we do not care to milk all the stock it will carry. It is our custom to raise our heifers, usually about twenty each year, and sell the cows when fresh in milk, and at an age when they bring the most. In this way our dairy is kept young and thrifty. Occasionally a pet cow is kept as long as she will breed, as her stock may be very valuable, but as a rule, we find it better not to have many old cows in our herd.

Most men know what to feed their stock, and I will not pretend to advise them. We fill two large silos, with as good corn as we can raise, and don't pick the ears. The Sanford we find best for our use, as it has a large growth and nearly every stalk has two ears. The big frosts of Sept. 22 and 23 hit us hard, but we think the ensilage as good as we ever had. Without the

silo the corn would have been of little value this year. We sow oats and peas, cut them green, and they make excellent feed, and the cows miss them when they are gone.

Every dairyman knows that only early cut hay is profitable to feed milch cows. The milk goes up in the pail, in the same ratio as the mow lowers when the early cut hay is fed. We find cotton seed meal the most economical of the feeds we buy in the market for *our* use. But in different localities cows need different feed as we have cause to know. On the farm we left in Peacham—"and a good one, too"—we *had* to feed bran or bone meal to keep the cows in condition, and a bone was at all times a great luxury, while on our present farm they eat bone meal only under protest, and mixed with other feed. Bran has been of little value to us as a butter feed, but is excellent for the young things. Cows must have about the right kind of care and feed to be profitable, but it is not good policy for the average dairyman to crowd his herd for a phenomenal record. Too many are lost in the operation, for a cow will only stand about so much and keep in running order.

There is little excuse at the present time for making *poor* butter, for most of us have good cows. All should have clean, comfortable, well ventilated stables, and the modern dairy implements. No one is well equipped without a separator. It insures about all the cream and excludes about all the dirt. One must have a suitable place to ripen the cream and make the butter. A room entirely free from the kitchen odors, or any other for that matter, must be had. A building by itself is best, and used for no other purpose.

When the butter is made put it in the most attractive packages possible, whether in tubs, boxes, or prints. I do not consider it necessary to describe the process of churning or working, to this audience. I would say, however, that we churn only twice a week and find no trouble in keeping our cream in good condition at any season of the year.

Good help enters largely into successful dairying. That farmer who has sufficient help in his own family is very fortunate—few are so blessed, however. If possible, get help that can *appreciate* good treatment, and treat them well. Give such a man a good team and good tools, and we should include among these a manure spreader, and corn harvester, and it is surprising to see what a large piece of corn he can care for, and how well he can do it. Few men will try to do their best with a poor team and insufficient tools, nor can they.

And now comes the most important part of the whole business—that of getting a good market for your product. The nearer producer and consumer can get together in all kinds of

business the better, and I know of no industry where it works to better advantage than in private dairy. If possible, sell direct to the consumer. Many whom I know find a satisfactory market in the towns and villages near which they live. For the past fifteen years very little of our butter has gone through the middleman's hands. We send to families in different cities. Many of our customers we never saw, but those to whom we sent first told their friends where they had their butter from, that it was satisfactory, and advised them to send to us, so that very soon we had customers for all our make. Almost every one has at least one friend in some of the large towns or cities to whom they can send butter, their friend has friends, and if the butter is good, they speak to them about it. Often a good market is made in this way. Once a customer is found, treat him so fairly, send him such good butter, that he will never leave you till he dies or moves away. There is great satisfaction in knowing just where your butter is going each week, and what you will receive for it. There is just as much satisfaction at the other end of the line for the buyer, who knows what he is to get, and what it will cost him. It is a well known fact that when people get accustomed to one dairy of butter, nothing else suits them so well. During the past year many of our farmers have sent their cream to Boston and are satisfied with the returns, and when one has no regular market for their butter, and can get the cream to the station without too much expense, I know of no better way to dispose of the product of the dairy, as long as prices remain as at present, and it is far better for the farm than selling the milk.

But in whatever form the product goes, let it be of the best, and it will be a long time before there is a surplus in the market of the world, of good butter, cream, horses or men.

Nor will the time ever come when we will feel obliged to burn any of these products in order to regulate the price, as the cotton growers of the South are now doing.

President Bruce:—There is an opportunity for discussion of this paper. Are there any questions you want to ask Mr. Gates?

A Member:—What do you feed your cows?

Mr. Gates:—We feed one feed in the morning, right after milking, of ensilage, and then after breakfast they are watered and have a feed of hay and in the afternoon they are watered again, and about three o'clock they have two quarts of cotton seed meal apiece and then a feed of the hay, then after the night's milking a feed of corn and oats. We do not feed high.

Our corn is all in the ensilage and we think we get about all the corn we need in that way.

Q. Feed ensilage only once a day? A. Only once a day, in the morning directly after milking.

Q. Feed cotton seed meal separately? A. Yes.

Q. How do you feed it? A. Different cows, different amounts, from one to two quarts per cow.

Q. Do you have any trouble in getting your cows to eat cotton seed? A. Never had any trouble.

Q. Do you feed cotton seed clear? A. Yes sir. We know we get better returns for our money with cotton seed meal than anything else.

Q. Are you ever troubled with garget? A. No, never had a gargety cow in our whole 44, never had a gargety cow unless from the result of an injury. I do not know as it is really the best way for every one to feed as we do but it works very satisfactorily with us.

Q. Wouldn't you like it better to feed your cotton seed on the ensilage? A. We have tried that but the cows look the ensilage over to get the corn out and sometimes throw the meal out so that it was wasted, and we have fed it clear without any bad results from feeding it in that way. There is no objection to feeding it with the ensilage if the manger is fixed so that we can get it out so that each cow gets its proportion.

Q. How much ensilage do you feed per cow? A. Feed a bushel basket full of ensilage to a cow once a day.

Q. Do you raise your own cows? A. Yes, sir, there is not a cow on the farm that we have not raised.

Q. About how many years do you keep them? A. We sell a great many cows each year and at different ages, but usually we have sold them anywhere from six to eight years old.

Q. Do you think a cow would stand that feed from eight to ten years? A. We have one cow 13 years old, the best cow in our herd. She has had that feed, always had a little extra besides, and she is sound in every particular to-day as she ever was.

Q. What breeds of cows do you have? A. Jerseys.

Q. Are you troubled with abortion? A. Have not been for seven or eight years, eight years ago it went through our herd.

Q. What did you do to prevent it, anything? A. Well, I do not know whether we did or not. I know we tried different things and finally we tried the Kow cure and we finally got rid of the trouble. The Kow cure was a great help to us.

Q. Do you still use that in your dairy? A. I do not. We have some but we have not fed any for years to our cows.

Q. Use any condition powders to make the cows give more milk? A. We bought some condition powders and fed our cows some and I do not know as it did our cows any harm, don't know as it did them any good but we did not buy any more this year.

Q. About how much do your cows average in a year? A. That is a hard matter for us to tell. In the summer time we have summer boarders. There are at least four months when there are from 35 to 40 boarders, say 50 in the family, and we use a great deal of milk and cream. During that time it is pretty hard to keep track of the amount of a cow's milk, but we have at various times when our cows were not all giving milk and most of them heifers, and all would average something a little less than a pound and a quarter a day; the cows would be nearly dry and there would be 10 or 15 and sometimes 20 two-year-old heifers in the crowd. That would be when we had only our own family, which is quite large.

Q. Have you always kept Jersey cows? A. Ever since I can recollect. Never kept anything else. We have had some grades, but very few.

Q. Do you give the young heifers any grain?

A. We do not. Our young heifers are given one feed of ensilage a day, and one feed of hay a day.

Q. Are your cows thoroughbred? A. Our cows are not registered. We had them in the herd book a good many years and then got out of it. Our bull is a registered bull, but few of the cows are registered, none of them in the book at present.

Q. Do you like the Jersey to raise stock from? A. We like the Jerseys for our business to raise dairy cows; if we raised them for beef we would not like the Jerseys.

Q. What do you do with your old Jersey cows? A. Don't intend to have many old Jersey cows. Our cows are sold when they are thriving and at good age.

Q. How do the prices run for your cows? A. From \$50 to \$65 our cows would average.

Q. Do you sell them to drovers or private customers? A. Very few drovers. We have sold to private customers mostly.

Q. Did the man who bought them make any money out of them? A. I don't know. The same men come back year after year and buy them, I do not know whether they make any money or not, they come back year after year and it would seem to indicate they were satisfactory.

Q. They won't stop to look at a Jersey cow my way. A. They come and look at ours and buy them too, but most of our customers are private customers.

Q. How many pounds of milk a day do you have? A. We are not very scientific and I cannot tell you. I know we have a good many of our cows that we have weighed the milk from, and I have weighed some that have given 45 pounds of milk, and in the winter time I know we have some that will give 40 pounds to a cow.

Q. What does it test with the Babcock test? A. We have no Babcock test. None of our cows have been tested except one and I have forgotten how much that was. We have frequently taken a cow's milk and saved it for a day or a week and I know several years ago we tried quite a good many of our cows and we made from $1\frac{3}{4}$ to 2 pounds of butter a day. We have had cows that we sold which afterwards made large records. We sold one cow to Mr. Jack Miller and she made the next June, $21\frac{3}{4}$ pounds in one week. We have never credited our cows any such record.

Q. What did you feed you cow; how much ensilage when she made that record? A. What record do you mean,—when we made from $1\frac{3}{4}$ to $2\frac{1}{4}$ pounds a day?

Q. Yes. A. I think at that time we had no ensilage, and I do not recollect whether we were feeding them grain at that time or not. Probably corn mixed with a little cotton seed. Now we have no corn, the corn goes into the ensilage and we find it answers the same purpose.

Q. How much meal do you feed with the ensilage? A. From one to two quarts of cotton seed meal to a cow each day.

Q. One or two feeds? A. One feed.

Q. You feed that on the ensilage? A. No, we feed that separately, we did put it on the ensilage but they rooted it over to get the corn and the cows that we wanted to have the most did not always get their proportion.

Q. How long have you fed cotton seed clear? A. I stated it had been four or five years.

Q. Never had any trouble with the cow's udder? A. Never, no trouble of any kind, occasionally a cow will get her teats stepped on and some cows get hooked but we never have had any trouble with garget nor any other trouble.

Q. Ever have any milk fever? A. Have not had for years.

Q. How large a herd have you? A. We have nearly 80 in all, calves and heifers. There is one matter I would like to speak of, maybe it will help some one. I think every dairyman who has any cows ought to have a teat lance. In the hands of one who knows how to use it it is one of the best tools a dairyman can have. I recollect we have disposed of cows in a few

instances because they milked so hard that it was worth more than the produce was worth to get it. This year we had one heifer come in and she milked so hard that the hired man utterly refused to milk that heifer; said he would rather give up his job. In a minute I made her as easy to milk as any that we had, by the use of the teat lance. I suppose every dairyman knows sometimes the teat will close up at the end so tight it is almost impossible to get the milk out, and by using this little instrument you will have a perfect cow.

Q. Is there any particular time when you use your lance?

A. If the cow had a good deal of fever I would reduce that fever before I used it, then use it as quickly as I could, with saltpeter water or warm water or milk to get the fever out, then use it and I have not had any bad results from it except in one case there was fever in the bag when I used it and there was trouble.

Q. Is this lance made something like a milk tube? A. It is a round, tapering piece of steel, the end is small and for about half an inch it is perfectly round and smooth, then wedge shaped with sharp edges. Give it a quarter turn and pull it back and the operation is performed satisfactorily.

Q. Where can I get a lance? A. Of C. H. Dana of West Lebanon, New Hampshire.

Q. How often is it necessary to use it? A. Once is sufficient.

Q. Did you make four cuts instead of two?

A. You do that, when it goes in it makes two and when you turn it a quarter round it makes two more.

Q. The lances that I have seen have been a long tapering tube that you run into the cow's teat and then you unfasten a long screw and as you pull it back it does the cutting. You can insert it in the cow's teat without cutting and when you draw it back it will cut.

A. I have never seen that kind.

Q. Where did you procure yours? A. Our machinist made ours.

President Bruce:—They are making butter up in Canada and they have creameries too. They have the same kind of problems to face and work out as we do and Prof. J. A. Ruddick, Dairy Commissioner of Canada, will speak to you on

SOME CREAMERY PROBLEMS.

Mr. Ruddick:—Mr. President, ladies and gentlemen:—I have listened with a great deal of interest to the very able papers and discussions which have followed them so far to-day. It does not take one long to see that you take more interest in butter

making here than you do in cheese making. It is quite true we make some butter up in Canada although cheese business is the principal branch of our dairying.

I think we have between eleven and twelve hundred creameries located in different parts of the country extending from the Atlantic to the Pacific. I come in contact with those creameries more or less, and know how the work is carried on in the different provinces and sections of Canada.

It is part of my official duty to manage several creameries which are operated by the Dominion government in North Alberta just under the shadow of the Rocky mountains. I was interested in the discussion this morning because those creameries are necessarily operated on the cream gathering plan. It might seem strange to you that the government should undertake to operate creameries. Perhaps a word or two in explanation will be sufficient. This district of Northern Alberta, which extends from about 50 miles north on the Canadian Pacific railway, a distance of 150 miles and is about as wide as that, is a country very much in all respects like this part of the world. It is not necessarily a woody country, they are going in some for farming and tillage and I think it will be a great dairy district in the future.

When that district was first settled seven or eight years ago, at least when there was sufficient settlement to warrant any attempt at co-operative dairying at all, we found we were unable to make a success of co-operative dairying because of the great cost of hauling the cream long distances, a small amount of butter was made and the cost per pound immediately went up and a number of creameries were started. The settlers were not as prosperous as they are now and they were not able to go on with the work and the Government came to the rescue, and said, "we will take hold of the creameries and charge you a reasonable price, and the government will stand the loss if there is any until the creamery is well established." This gave confidence to the settlers, they said, the Government is going to run these creameries and we are sure of our money. The result is today that we have some first class creameries that are well supported and they have reduced the price of manufacturing down to a little over two cents per pound.

Then they had to get some new markets as they were too far away from the Atlantic to take much of the export trade and consequently we were obliged to look to the far east.

Now just that word of explanation I thought was necessary. It seems to me one of the problems that would engage the attention of all dairymen is how we may best show the producer of milk—how we may best point out to him the lines upon which

he can improve the average production of his dairy. We have had good advice along this line this morning. It does seem to me there is no phase of dairying today that affords such a field for improvement. We know what the average cow is. I believe the average cow produces just about the same with us as it does in this country, there is not a great deal of difference. You may, as a state do a little better than we do as a country because you are more generally interested in dairying than we are. The average of milk per cow is about 3,000 pounds, but the average cow is rather an expensive animal to keep if we are to believe all we hear upon that point. I do not believe this is a question that can be figured out in dollars and cents correctly. It must be evident there is great room for improvement in the production of milk as we are undertaking to do some work along that line, just north of you, here, in the eastern townships. Last spring we started to take a cow census; that work is still going on, so I cannot give you any complete record, just give you one or two figures along the lines in which we hope to create sufficient interest in this matter upon the part of dairymen with a view to improve the general efficiency of the herds.

Now they began in the month of May and got fully started in the month of June testing the milk of each herd. This was done by furnishing each patron with the proper method for keeping the records, then supplying the small sample bottle, holding about six ounces of milk, in order to keep the sample for the month. They were asked to weigh the milk night and morning on the 3d, 13th and 23d of each month. That would be six samples put into the composite sample bottle. That is not a very exact record but you can make a pretty fair estimate of the amount of fat which each cow made by such a test.

We tested 61 herds in the month of June. There were 945 cows in those herds; the average pounds of milk per cow during that month was 625 pounds. I do not know whether that is a fair average or not. There was not anything especial about any of those herds, they were just ordinary herds.

During the month of October there were 23 herds tested, a total of 335 cows and the average production of milk was 327 pounds for the month of October. During the month of June we found the individual test varied from 2.4 to 6.5 per cent. of fat.

In the month of September there was one herd of 24 cows that gave a total of 1,260 pounds of milk which tested 4 per cent. Another herd of 24 cows gave 9,130 pounds which tested 4 per cent.; then 23 cows gave 8,120 pounds of milk with a total of 371 pounds of feed. Another herd of 23 cows gave 11,200 pounds of milk with a total of 647 pounds of feed. Convert that into

butter and that means that the first herd of 23 cows gave you \$86 in that month and the other \$150 in that month.

We are just bringing before the dairymen in that district some facts like these and then we intend to extend that work during the coming summer. It is our intention to take that in connection with the cheese factory and make the cheese factory or creamery a unit for working this scheme. The samples can be collected and brought to the cheese factory or creamery and we believe it is in the interest of every creamery and cheese factory to take this matter up. It is a more satisfactory condition of things if the milk of the herds for a certain creamery can be increased in a year or two, and I do not think but what that sort of thing can be done in almost any creamery or cheese factory of the country.

Now then, there was another problem which we talked about, and that is the care of the milk or cream. The care of milk or cream seems to come up at all our meetings. We have some of the care of the milk because we do not have in eastern Canada a great deal of cream delivered at the creamery.

The question of aeration receives much attention. Ten years ago there was a demand by all handlers of milk that there be proper aeration of all milk; it came to be so that it was advised the milk should be aerated and not cooled for cheese making purposes. But we learned this, that the aeration of milk without regard to the circumstances or condition of the atmosphere is a very dangerous process and I believe that more milk has been injured by aeration for cheese making purposes than has been benefited.

I am not very clear as to what the advantages of aeration are. I do not know as I have ever heard a good scientific explanation of what the benefits of aeration are. Of course when the milk is exposed certain gases that are in the milk escape readily and other gases take the place. That is undoubtedly true as I believe has been demonstrated, but I am not clear that there is any decided advantage in aerating milk for cheese or butter making purposes. But I do know this, and many tests have been made to demonstrate that point, that if milk is aerated there is great danger of its being more affected from being exposed than that it will be improved.

I think that a great mistake was made in years past in advocating the aeration of milk and not cooling. I think that point came up yesterday. I heard some one say something about it, and a butter maker stated he always found there was great benefit from milk cooling. I feel that I cannot urge that too strongly. It is a great benefit to have the temperature of the night's milk reduced to 65 degrees before it is left to remain

over night. In one of our conventions at Ontario a resolution was passed that the patrons be recommended to cool their milk to 65 degrees instead of depending upon aeration. Now then, something has been said about the difficulty in handling milk and cream; that point was discussed this morning. I could not agree with some of the statements that were made. It seems to me that there is no doubt but cream may be taken care of just as easily as milk. I would far rather undertake to handle the cream from a given quantity of milk than the milk itself. Cream will not be contaminated more readily in cream than milk and fermentation does not take place so readily in cream as in milk which contains a larger proportion of fat. There is less fat in cream, cream being exposed will receive contamination as milk will, but the fermentation as the result of contamination will not develop so rapidly as in milk, taking equal conditions in regard to other things. I will come back to that point later and we will discuss some things in connection with creamery work.

Now then, we have this question and this problem of the cream gathering vs. whole milk systems in some sections of our country of late, but I quite agree with what has been said here about it, no matter how much we may regret the fact, the hand separator creamery has come to stay. That is the conclusion we have arrived at. When the hand separated cream first made its appearance there was a great deal of complaint made; the largest concerns condemned this system in every way, but there is now no doubt that the hand separator system will stay with us. I will say this, there is no reason why just as good butter cannot be made with the hand separator system as there can with the whole milk system. There is no reason why we cannot handle the cream and make as good butter on that system as on any other but there is one point that has been overlooked: The very day we begin to separate the cream from the milk at the farm, just at that time is the operation of the creamery extended to the farm. We have not recognized that point. The man who separates the cream becomes a part of the operations of the creamery and is connected with it and must be treated as such. It would seem there were one or two things must be done, either the cream must be delivered at the creamery in a fresh sweet condition, so the butter maker will have control of the ripening process, or the cream gatherer must be a trained man and recognized as a part of the process at the creamery, so that he can give advice and criticise the cream and point out where improvement might be made, or where it is necessary to reject it. Now that may be a difficult thing to do and there are difficulties in the way of most of the success with this hand

separator creamery. I deplore the fact that we have got to accept it. I believe while we may make great improvement upon the system as operated at the present time, we have turned back as far as progress in making a fine article is concerned. We have to begin some things over again and it is a great drawback we feel on the other side of the line where we are competing with the export trade of Denmark, New Zealand and Normandy, and the extension of the dairy business to-day depends upon the export of creamery butter. We have about reached the limit in the production of cheese and we must turn our attention to the making of butter. It is a serious problem for us to deal with, we have the same difficulties you have here. Now some attention should be given to the handling of the cream on the farm. I believe every cream separator should be supplied with a cream cooler; that the separator companies should supply some type of farm cooler as a part of the equipment of the separator, if they did so it would be more likely to be used than it now is. I mentioned this fact to the manager of a separator company in Canada. He said, "We have to sell our separators, and it takes all our time to sell our separators without selling something to go with them." I told him the separator companies were making a very serious mistake in the attitude which they were adopting toward this new line of work. Some companies here, and I know it is so with us, have misrepresented very much the conditions under which the hand separator should be worked satisfactorily. They have induced farmers to buy it on the ground of great saving of labor and that always appeals to a farmer. It would be much better if the separator people would go frankly to the farmer and explain matters to him or at least tell him how he can get the best results.

Now there is another thing. I know there is a great difference in butter and cheese makers, I would not have some men work for me if they would work for nothing. I am a butter and cheese maker; I have been through the mill and know what we have had to contend with and I think the cheese maker and butter maker in Canada have done more than any other class to raise the work to a higher standard, and I believe if we had a higher standard among our butter and cheese makers we would get better results. Now there is just one other problem that we are taking hold of to the best of our ability at the present time and that is the improvement of the sanitary conditions surrounding the factories. The condition of things which exists around the average creamery is not very creditable as a rule. One of the great drawbacks in many factories is that there have not been proper arrangements made or proper care taken to secure perfect drainage. In the Dominion we have a law

which compels every creamery to have a water tight flue to carry the drainage away. One closed tile drain for so many rods from the creamery and then it is taken care of in a large cesspool. There is no open drain and so we do not have that nuisance that is around too many creameries.

I am too, a great believer in having the surroundings of creameries and cheese factories improved, have a few trees, a little lawn, etc. It would take but little time to keep the lawn in order and it does make a difference with the appearance of things. We think the cheese factory or creamery should be the most attractive place in the neighborhood and if the patrons take note of those things they will also improve along those lines, and if I was a patron I should demand more attention to be given to this, I would not allow my milk to go to a place where it ran the risk of being contaminated. I ought not to talk any longer but if there are any questions that I can answer that will be a help to you I shall be glad to do so.

Q. Do you put the cement floors of your creamery on the ground?

A. Put them on the ground, make a good foundation and drain it well, so the frost won't get to it and break it up. We make the floors just as we make cement sidewalks in towns or cities. I suppose you know the ordinary specification for that purpose, broken stone, sand, gravel and cement make up the bed of the concrete about four or six inches thick on the surface of the ground if it is perfectly hard and dry, and if it is not very solid it is well to build it up with sand or gravel, something of that kind and then roll the surface. There are a great many cement floors improperly made that are a great nuisance. A great many try to save a little by putting too large a proportion of sand in the cement.

Q. Would you consider it desirable for a creamery to tell all their patrons to whitewash their stables once or twice a year and things of that kind, or would you feel that the creamery had a right to do those things?

A. I have known some places where such things were being done. There are two or three very large milk firms that insist that the stable shall be whitewashed and the milk be kept in a certain way and delivered in a certain way, but I think those things will have to be very largely a question of education, illustration and example.

Prof. Cooley:—Mr. President, there is a problem I have been thinking of and I think it should be more thoroughly considered than it has been. I know some districts in Massachusetts where patrons are so located that their product may go to any one of three or four different creameries, is it any wonder that

such a patron becomes, as one creamery man said, "so d—— independent you can't do anything with him." That is a time when independence becomes a menace so to speak.

Now my experience as a business man is in the retail milk business and we have competition there, lots of it, but it has been my experience ever since I started never to say a word or do an act to injure a competitor; never to seek a competitor's customer. If customers come to me to seek my product I am glad to supply them, but if a competitor is short of milk and we have milk we supply him and there is a common good feeling as the result and in five years' time we have been able to raise the price of milk one cent a quart, we can shrink our sales 20 per cent and get just as much money as we could five years ago, of course that is 20 per cent. less with the cost of raw material.

Q. Got a milk trust? A. No milk trust, it is just common good feeling. If you creamery fellows and cheese factory fellows would hit it off together a little more and get better acquainted it would be better for you.

Reddick:—There is a good deal in what Prof. Cooley says. It does seem as though something might be done to overcome the intense rivalry of the creameries. Now, we are talking of licensing the factories, and if we do that the factories will have to come up to certain regulations or they will not be given a license. A great many think that it will have some effect to injure the butter factories, and it will some of the smaller ones. I do not know how much there is in that argument, but so far as the Province of Quebec is concerned I think we shall license the butter and cheese factories and then I think before long the apparatus of the Babcock test will have to be inspected just as scales, weights and measures are inspected now, one is as necessary as the other and rather more so. We have discussed this question, the licensing of factories, for two years, and now the only trouble is that public opinion probably is not quite strong enough to warrant taking it up. The government cannot take up a thing of this kind until there is strong enough public opinion behind it to support it, so that our present work on that line is one of education.

Mr. Albree:—I came to Vermont to-day from Concord, Mass., for two reasons. One was to meet certain breeders of stock in Vermont from whom I have bought cattle and paid \$100 per head, and second to hear Prof. Cooley from my own state whom I have never heard before. One practical lesson I would like to bring to the Dairymen's Association in relation to the hundred dollar cow. We have bought her and she is the cheapest cow we own. Two years ago I purchased from Mr. Winslow of Brandon the ten best cows he had in his herd and

paid him over \$100 apiece for them. I have them in my barn to-day. I think by this time they have paid for themselves. They stand pretty nearly between the good and the choice class of Prof. Cooley. I am milking 33 cows out of a herd of 41; the income for last month of the 33 cows that is left will be over \$500. How have I been able to pay \$100 for cows and make any money out of them? I have been able to do it because I felt that the yield of those cows would bring me sufficient income to justify that expenditure; and second their off-spring could be raised and sold for enough more to make up the difference. I think on the first proposition I worked the proper ground, on the second I reckoned without knowing just what I was doing. We have no pasture and have got to give up the raising of stock or keeping thorough-bred stock, unless we can find a market for young stock, and I want to see in my trip here if I cannot find in Vermont a market for young stock from cows which will come into the class which Prof. Cooley has just talked of. Given this, how long will it take a Vermont farmer, from his herd to-day to raise good and choice cows; how much will it cost him to go into Massachusetts and buy heifers out of good cows, by good sires, and in two or three years have herds which will stand far ahead of the average herd in this state?

I heard a herdsman in Vermont a year ago say he thought I was foolish to pay such prices. He suggested that I could go into the finest dairy county of Vermont and buy nice cows for \$50.

I went to one of the best breeders and he told me I had better give up my trip and go to Brighton market and get them. I went there and the proprietor said: "It is only occasionally that I get that type of cow." He said the demand on the Brighton market has been so great that that class of cows has been taken up.

Prof. Hills:—I was asked to-day what to do with a big back pasture and I suggested in my judgment the best thing was to turn it into a cow kindergarten. The farmers in this state who have good pastures, in my judgment, cannot make them serve them better than for the purpose of building up young cows of the good and choice type that sell in Massachusetts as two and three-year-olds. It has been my privilege several times to talk to conventions in Massachusetts—my native state. The first time I went down there I used to urge them to breed their cattle over and over again. They told me they lacked opportunity and lacked pasture. The trade is all for the city. We have not got the time nor the money to give that must go to the extension of our herds. Seems to me such counties as Orange and

Washington counties are very well adapted to do this work the gentleman from Massachusetts was speaking about.

Go and get bulls of the Prof. Cooley kind and get a good class of cows and breed up the animals and sell them in Massachusetts. I know some farmers in the state of Connecticut who are doing just that kind of kindergarten work.

Prof. Cooley:—I think that is a very fine idea. We cannot do much of it in Massachusetts, we haven't the pasture, but I should think here in some sections of Vermont it might be tried and prove a solution for that problem.

Q. Will it make any difference what breeds of cows they are?

Mr. Albree:—I do not know that the gentleman addressed his remark to me, but I know of a gentleman who purchased three Jersey cows from Secretary Davis three years ago when he insisted upon one hundred dollars each and I think the record shows the cows gave between seven and ten thousand pounds of milk a year; they were registered.

The grades which we have are mostly Ayrshires and Jersey grades and they will come into the good and choice class.

President Bruce:—We now come to the election of officers.

On motion of Mr. Northup the Secretary was directed to cast the ballot of the Association for H. C. Bruce for president for the year ensuing. The ballot was cast and Mr. Bruce was declared elected president of the Vermont State Dairymen's Association for the year ensuing.

President Bruce:—Gentlemen: I thank you for this renewed expression of your confidence in me and I thank you for the assistance you have given me and for the patience you have had with me. I will try and serve you to the best of my ability during the year ensuing.

The next officer to be elected is First Vice President.

Mr. Blood:—We have got a member of this Association, although some of you may not know him, whom I wish to nominate as first vice president; it is B. A. Hatt of South Ryegate.

Motion seconded and the secretary was instructed to cast the ballot for B. A. Hatt for first vice president.

President Bruce:—The next officer to be elected is the second vice president.

C. F. Smith:—I wish to nominate one of the present vice presidents, George H. Terrill from Morrisville for second vice president and that the secretary be instructed to cast the ballot for Mr. Terrill.

Motion seconded and the secretary cast the ballot for Mr. Terrill, who was declared elected.

President:—The next officer to be elected is a secretary.

George Aitken:—It gives me great pleasure to again nominate the present incumbent, Mr. F. L. Davis of North Pomfret. I do not think the Association can do any better than to keep its present incumbent in office. And I move you that the president be instructed to cast the ballot of the Association for Mr. Davis for secretary.

Motion seconded and Mr. Davis was declared elected for the year ensuing.

Mr. Davis:—I will not try to make a speech but I thank you very much for this expression of the confidence you have in me by again electing me as your secretary for the seventh year, and I shall endeavor to perform my duties to the best of my ability.

I want to thank all the members of the Association for the help they have rendered me in the past and in aiding me to make this meeting the success that it is, also the dealers in dairy implements for the exhibition we have, which is one of the best we have ever had.

President Bruce:—The next officer to be elected is the treasurer.

Mr. Hitchcock:—It gives me great pleasure to nominate Mr. M. A. Adams of Derby to serve as treasurer for the ensuing year, and that the secretary be instructed to cast the ballot for Mr. Adams.

Motion seconded and the ballot was cast and Mr. Adams declared elected treasurer for the year ensuing.

President Bruce:—Please nominate for auditor.

On motion, which was seconded, the secretary was instructed to cast the ballot of the association for Mr. C. F. Smith of Morrisville for auditor.

President Bruce:—This completes our list of officers. Is there any other business that should come before us at this time?

Secretary Davis:—Just a moment. I wish to say this year after a good deal of deliberation we decided to drop special premiums. We have done so and the supply men have subscribed very liberally to the Association fund; this, added to what our butter will bring, will, I think, bring the fund up to \$700, and perhaps more, and there are many of the boys that are here that will receive enough from their butter to pay their expenses. I would like to hear from those who are interested in the butter exhibit how they feel towards continuing this another year; it would help the officers a

great deal. If we are to continue this year we want to know it, and if not we want to know.

Hitchcock:—I would like to enquire how the money is to be divided.

Davis:—Butter that scores below 90 will not receive anything. If we have 400 points above 90 and have \$800 to be divided each point will be worth \$2.00; if you score 91 you get one share of that \$800. If you score 95 you get five shares. It is easily divided and easily reckoned; you get such a share of the \$800 as your butter scores above 90. I want to say that all the exhibitors whose butter or cheese scores above 90 will receive a check inside of two weeks.

Hitchcock:—I will make the motion that the Association do continue in this way another year. I would like to hear the question discussed. How would it do to have the standard raised to 92 instead of 90. I would make that motion that the standard be raised from 90 to 92.

Mr. Adams:—Mr. President, I should be the last one to oppose any measure that will advance the standard or the grade of the exhibits of this Association, but, in my opinion, the score of 90, 91 or 92 is a pretty mighty good score for winter butter. A great many of our creamery boys do the best they can with the product they have to do with, and they put up a package of butter. You understand this butter is given to the Association. They contribute that butter; they score below 92 and they have not only lost their butter, given to the Association, but they don't get anything to pay their expenses out of this pro rata fund. It seems to me that you raise this to 92 another year, then, perhaps, raise it to 94, and many of them would be discouraged and will not feel like exhibiting their butter.

Mr. Vail:—It seems to me this is an important matter touching the interests of our Association because the butter exhibit is largely the foundation of our good work. I am not familiar with the workings of the system and I would like to enquire in regard to the numbers of exhibitors that draw a premium; how it compares, the present method under the present rule with those in the past, the number that exhibit.

Secretary Davis:—We have 141 exhibits of butter and cheese; five exhibits scored below 90 of butter and one of cheese. Five exhibits out of 141 below 90 is the way we have it figured now. We shall go over our records again to make sure we are right.

Vail:—How many under the old system?

Davis:—There used to be something like 12 or 14 out of 150. We had 148 exhibits of butter and cheese last year.

Vail:—Have you any idea what proportion are above 92?

Davis:—A good deal more than half. I seriously question the desirability of putting the standard above 92. If I was going to raise it at all I would not but one point; and I do not know as I am in favor of raising it one point. It makes quite a difference to some. If they do not get but one point they get \$1.25 or \$1.50 and they feel that they are getting what their butter was worth and some more.

Mr. Northup:—I agree with Mr. Davis. It is pretty hard to get butter to score above 90. I think it is a good scheme to keep it down to a scale where all the creameries and butter makers can get a little share. I do not think it is well to put it up where only a few would get any benefit from it.

Mr. Hitchcock:—Seems to me there should be a little competition in these matters. If you put the standard up to 92 probably two-thirds of the people who bring butter here will get something out of it. So far as the difficulty in making good butter in winter is concerned, probably two-thirds of those who send butter here succeed in making butter good enough to share in the premium.

Mr. Hitchcock's motion which had been seconded was then put to vote and the vote to raise the standard from 90 to 92 was defeated, while the Association retains the present system. Adjourned.

Wednesday evening, Jan. 11, 1905.

The annual banquet of the Vermont State Dairymen's Association was held in Armory Hall. Bascomb Brothers of Montpelier, caterers, served a fine banquet, plates being laid for 400 guests and all seats being taken. Wilder's orchestra of eight pieces was in attendance and rendered excellent music, as they always do.

Those present were called to order at eight o'clock by President Bruce, who introduced Mr. E. A. Nutt of Montpelier as toast master.

After a selection by the orchestra Mr. Nutt gracefully introduced Governor C. J. Bell of Walden, who responded most earnestly to the toast "Vermont." Senator W. A. Lord of Montpelier was next introduced, who responded to "The Legislature of 1904."

The toast "The University of Vermont and State Agricultural College" was responded to by Prof. J. L. Hills of Burlington.

H. D. Hopkins of Montpelier, a member of Wilder's Orchestra, gave a dialect reading, which was followed by a selection by the orchestra with cornet solo by Karl Forsell.

The toast master next introduced Prof. F. S. Cooley of Amherst, Mass., who responded to "The Agricultural College of Massachusetts," followed by Ex-Governor Josiah Greut of Derby on "Industrial Education."

"The Hayseed" responded to by Will Templer Becker of Schenectady, N. Y., was followed by Dr. G. M. Twitchell, editor of Maine Farmer, of Augusta, Me.

Col. C. W. Scarff, of Governor Bell's staff, of Burlington was the next speaker. After a selection by the orchestra Hon. Walter E. Ranger, State Superintendent of Education, of Montpelier, responded to "Our Schools."

The toast "The Ladies," by The Rev. Guy C. Lamson of Montpelier, followed by the orchestra, closed the banquet programme, and although at a late hour scarcely a person had left their seats.

Each speaker was at his best and wit ran high. Jokes were cracked and stories told which made the hall ring with laughter, and all pronounced it the liveliest after dinner speaking that Montpelier had witnessed for a long time. Toastmaster Nutt was sharper than a two-edged sword and each speaker got a good, fitting send off, which always adds to after-dinner speaking.

The meeting was then adjourned until 9.30 A. M., Thursday, January 12.

Through the courtesy of the Worcester Salt Co., the menu cards were tastily printed on a small Worcester Salt bag, with a pink at each plate. The unique menu cards were all taken from the tables by the guests as souvenirs of the occasion.

Following is the menu:

VERMONT DAIRYMEN'S ASSOCIATION,
MONTPELIER, VT.
January 11, 1905.

	Raw Oysters	
Celery	Olives	Sweet Pickle
	Boiled Salmon	
Saratoga Chips	Cold Meats	French Peas
Roast Beef	Vermont Turkey	Lamb
Ham	Pork	
	Ox Tongue	
	Chicken Salad	

Cream Dressing		Parker House Rolls
	Vanilla Ice Cream	
	Assorted Cakes	
American Cheese		Cream Cheese
	Neufchatel Cheese	Dairy Cheese
	Crackers	
Oranges	Bananas	Apples
	Coffee	

Cream and Neufchatel Cheese furnished by F. H. Bickford,
Bradford, Vt.

Thursday A. M., Jan. 12, 1905.

Owing to unavoidable delays the meeting was not called to order until 10.30 by the President, who said: "The first paper of the morning is "The practical farmer of to-day" by Mr. Willis N. Cady, a member from the west side of the mountain.

THE PRACTICAL FARMER OF TODAY.

When the Secretary of this Association asked me to write a paper upon "The practical farmer of the day" the question came to my mind, what can I say to this audience of practical farmers that will in any way add to your knowledge, and I concluded that it would be foolish to try.

If I can bring to your minds in a fresh manner things that you know already, I shall therewith be content. This is a day of progress. I venture to say that no century of the world's history has shown so many changes for the better as the past, and our own beloved country has set the pace. Agriculture is the business of the country. Secretary Wilson, who is doing so much for the farmer of to-day makes these comparisons:

"All the gold mines of the entire world have not produced since Columbus discovered America, a greater value of gold than the farmers of this country have produced in wealth in two years. The products of the farm for this year alone amount to more than six times the capital stock of all the national banks, to twice the sum of our exports and imports a year, three times the gross earnings of the operations of the railways and to three and a half times the value of all minerals produced in this country, including coal iron and ore, gold, silver and quarried stone." Just as sure as the farmers have good crops and are prosperous the whole country feels it and good times prevail. Let an era of agricultural depression come, and manufacturies

stop, railroads cease to pay dividends and in fact all industries are affected.

Every business to be successful must have practical men to manage it, and in no other calling of the day do we need them more than in farming. The practical farmer of to-day, *not* of yesterday. What strides we are taking these days! Did you ever stop to think how farming was conducted in this state one hundred or more years ago when the country was comparatively new? In those days men of muscle were required, now we must have muscle and brains working together, or we shall not keep up in the race.

In the town where I live and not far from my home, stands the house of one of the earliest settlers of that section. He came there, cleared a little land, built a log cabin, put in a crop of wheat and then kept on clearing land. At harvest time he had no barn and no place to save his crop, but "necessity is the mother of invention" so he took his axe, the principal farming tool of that time, cut some straight basswoods, split them and fitted them together for a floor, threshed his wheat and winnowed it in the wind, and then took it on horseback twenty-five miles through the woods to be ground into flour. He lived to be over ninety years old and told my father that he had raised hundreds of bushels of wheat since, but never felt as rich as he did when he secured that first twenty bushels. We are not required to farm in that way now. We must adapt ourselves to the times and also to the locality. The branch of farming that will pay in one place might be a failure in another. We should also choose that branch to which we are personally adapted, in fact we must like our business. If horse breeding, we must like horses; if dairying, we must like cows; if sheep raising, we must like sheep, and so on, for where our hearts are there our minds will be, and the practical farmer *must* have his mind on his business.

A man with a good theory is all right but if he cannot put it into practice it is of no use. Theory and practice should go hand in hand, but if we can have but one give me the practical man. I knew a man who went up and down the country telling people how to farm it and he died a bankrupt. He knew the "how" but could not put it into practice. On the other hand how many ignorant men are fairly successful because they are practical.

I would not deprecate knowledge. If any man to-day needs an education it is the farmer. Let us have the "know how" and then put it into practice. The more we get it instilled into the minds of the young people, that it takes brains to run a farm, the less trouble we will have in keeping them on the farm. Farm-

ers of Vermont, let us elevate ourselves to our calling. This is a day of specialties. We have them in all of the professions; we find them in every vocation; men that know how to do one thing well. These are the men that make a success of their business. Some are inclined to think that to be a specialist, means to be narrow minded—to know one thing, and that only. If I am not mistaken a true specialist is a man of broad mind, who keeps in touch with all important events that are taking place, but more especially with those that bear on his business.

The practical farmer of to-day *must* be a specialist. He must take some particular branch of farming and *push* it for all that it is worth, not neglecting any other branch that will work along with his specialty. Whatever we do let us do our best. If our specialty is horses let us keep the best; if sheep, we must not be satisfied until we have the finest in the world—and we have them over in Addison county, both horses and sheep, that lead the world in some particular breeds; but perhaps the specialty most adapted to Vermont farmers is dairying.

The saying goes that "there is always room at the top for the best man" but let me say right here that there is room at the top for every dairyman in Vermont if he wishes to get there. Let us get to the top and stay there. A great many young men start life in debt and the great question with them is, "Will dairying support their families and give them some of the comforts of life and pay their debt?" I can answer from experience that it will. A few points in this specialty need particular emphasis:

1st. We must have the cow. Success or failure centers in her. I am not particular what breed she is, if she is a good one, but I think that the nearer we can get to a pure bred animal the better we shall be satisfied. The practical dairyman must not keep a cow that does not yield a profit; if he does there is less chance of that debt being paid. It does not cost much more to keep a cow that yields \$25.00 profit than it does to keep one that runs us in debt \$25.00, and remember that it is just as much work to take care of the poor one as it is the good one.

Dispose of the poor one at once. I think that we should not keep a cow until she is too old for profit; there is always a market for good cows at a fair price and the practical man should have his dairy so arranged that he can sell a few good cows every year, that is, if he sells five cows, he should have five good heifers to take their place.

We should have good quarters for our cows: Warm, light, well ventilated and convenient. The practical man will have his stables arranged so that he can do his work with the least outlay of labor.

We must save all of the fertilizer possible, both liquid and solid. If there is any secret of success in farming I think this is it. We must strive to make our farms produce more. "Make two spears of grass grow where one did," and we cannot do this without fertilizer. My experience is that it pays to make and use all of the home made fertilizer that we can before buying chemical. By way of experience I will say that since buying a run out farm and going in debt for it fifteen years ago, I have bought some chemical fertilizers every year, putting it on that part of the farm farthest from the barn, using the barn fertilizer near the barn where the cost of drawing is least. Where fifteen years ago I kept ten head of cattle and three horses, last year I kept twenty-six head of cattle and six horses and sold twenty tons of market hay, and the debt is paid. Pardon this depression.

The next problem for the dairyman to solve is the feed. What kind, how much and when to feed. If we are just starting we must rely on the experience of others.

A safe rule to follow is to grow all of our feed that we can. I have always made my grain bills balance, that is, I have raised good clean grain and have sold enough for seed to more than pay for what I have bought. I sometimes think that it would be a good thing for Vermont farmers if they could not buy any western grain for a few years. I think that it would make us more independent. Perhaps it is best as it is but are we not paying more money for feed stuffs that we should? The silo is a great help to the dairy man, it keep our corn "which is the best crop that a Vermont farmer can raise" in such a shape that the cow gets nearly the full benefit of it. Feed your cow such a ration that she will yield the most profit. I think that each man must settle this in a measure for himself. Be gentle with your cows and it will pay you in dollars and cents. A cow is very sensitive and responds to harsh treatment just as quickly as she does to good.

We have some good cows, a comfortable stable and the right kind of feed. The next question is, what shall we do with our milk. A few years ago we had but one answer—keep it at home! Now our state is dotted with creameries and cheese factories. Milk cars stop at our stations and take milk to the city markets. Each man must decide what will pay him best. The practical farmer should market the finished product when he can. I should advise a young man with a moderate sized dairy to patronize a co-operative creamery or cheese factory, if one is convenient. If he patronizes a creamery separate his milk at home if possible.

Let me say right here that the co-operative creamery and factory have done more to build up the dairy business in this state than any other thing that I know of. They have made it possible for the small dairyman to do as well as the large one. Let us improve them.

In my own town I think that the dairy output has doubled in the last ten years. Send just as good clean milk to the creamery or factory as you would keep at home. If we patronize a creamery our skim milk becomes a source of profit. A neighbor who keeps sixteen or eighteen cows said that his skim milk paid his hired man this season. He fed it to pigs and marketed them when five or six months old. We should keep pigs that will be ready for market early. When a pig will dress 150 to 200 pounds sell it; you have about all of the profit.

Raise good calves. Get them well started and then keep them growing. A calf that is starved the first year will never get over it. One good one is better than two poor ones. When she becomes a cow she will produce as much butter and sell for as much as the other two, at one-half the cost of keeping. The practical dairyman must have for a motto ever before him in stable and calf barn and pig sty this one word, "Cleanliness," without which success may turn into failure.

All honor to the cow as a mortgage lifter. The help problem is one that confronts every farmer more or less, whatever specialty he pursues. This must be solved in part by making use of labor saving machines, doing less work by hand and more with horses and engines. We can plant and take care of a field of corn without the aid of a hoe and keep it free from weeds. We should buy the best tools and then take care of them—remember that rust will destroy quicker than wear. When not in use keep them housed. It will pay. In my father's family the help question was solved by a team of six boys "of which I am the smallest." This I presume is the best way, but notwithstanding many of us continue to depend on hired help. The cheapest man that I ever hired was the man that I paid the most. If you can get a good man, hire him, pay him well and keep him. Don't make a machine of your man. Consult with him about the farm work, give him a day occasionally when the work is not pressing, furnish plenty of good reading for the long evenings, and above all let him know that you place confidence in him and you will not regret it. Help that can not be relied on is a misfortune and should be dispensed with as soon as possible.

The practical farmer must keep his buildings in repair. Lumber is not as plenty and cheap as it was a few years ago and it costs less to take care of a building that it does to repair one. If it is necessary to build put as much under one roof as possible,

make a good foundation and use plenty of paint. We should dispense with all needless fences. Make our fields as large as possible, and long instead of square. When needed make good fences. Better no fence than a poor one. The old rail and board fences have had their day and the practical farmer cannot afford them. Wire and woven fences have taken their place and are better and easier to keep in repair. Get the best—it is the cheapest. This is a safe rule to follow in every thing that we buy. The highest priced article is not necessarily the best. A small farm well cultivated is more profitable than a large one with the farming half done. If we can grow three tons of hay on one acre, is it not better than to go over three acres for the same amount?

The practical farmer can find work to do throughout the whole year. What other business will be successful if pursued one half of the year and the other half spent in idleness? How many farmers follow this method and then complain of hard times. Success in any pursuit means every day. Success should not always be measured by dollars and cents. It means more than this, the only value that money has is what it will purchase. The practical farmer will be liberal in the support of church, schools and roads, without which our country would not be worth living in.

If I was an artist in the use of words I would draw a picture of the "Practical Farmer of To-day" and his farm. Everything around the farm betokens good management. Neat, well painted buildings, nicely kept lawns with shade trees, large gardens with all of the small fruits in their season. An orchard of healthy, well pruned fruit trees loaded with apples and pears; clean road sides; no unsightly fences covered with brush and weeds; clean fields, filled with crops well cared for; well watered pastures in which graze contented cows; the house fitted with all of the conveniences that lighten the work of wife and daughter. Good reading and music tend to make life worth living. The daily mail and telephone keep the family in touch with the world at large.

Interested in the affairs of his town, state and country, the practical farmer is prepared to occupy positions of trust and honor, and if need be defend his country in time of peril.

Surrounded by a family of boys and girls, as he should be, with the wife of his choice at their head, leading them in the way that tends to pure and righteous living, who will dare to say that his calling is not a successful one? Well may the over-worked business man of our crowded cities envy the clean, healthy home life of the "Practical Farmer of To-day."

President Bruce:—There are a few minutes left now for discussion.

A Member:—I understood Mr. Cady to say that he sold seed enough to pay for the best cow he had, will he please explain that.

Mr. Cady:—Perhaps I have not fed as much grain as some of the farmers in the eastern part of the State. Our county is quite a place for grain and I have always had good clean seed, have raised considerable barley and oats, have raised considerable grain every year. I have not a very large dairy, am not a very large farmer, but I have some land on which the best of hay can be grown and when it is cut in the right shape it is very nutritious and good for milk; and then I have a silo and I calculate to get that filled with good corn, if I can. I have not been successful every time since I have had it, so I have fed as little western grain as I could.

Q. What kind of hay do you raise. A. Our hay is timothy and clover. The hay that I have sold is timothy. I think it is a mistake for most of our farmers to sell hay but my pasture is not sufficient to keep what cattle I can winter. I could keep 40 cows very well during the winter but I have not got the pasture so that I can summer feed them so well.

Q. How many cows do you keep? A. I have from 18 to 22 or 23. I can only pasture about 18.

Q. Have you ever tried alfalfa? A. I have not.

Q. Know whether it is feasible? A. I don't know. I think Mr. Aitken can tell better about that than I can, the most I know about it I heard from him.

Mr. Aitken:—I have had considerable experience with it for two or three years. So far it has been successful most of the time. I have cut about eight tons of it and it wintered first rate. It winter-killed in spots last winter the same as other grass. Where water stood and ice formed it killed off. But outside of that it did first rate.

Last summer I was under contract to the Government to grow some alfalfa seed. The contract read I should leave the second cutting for seed. I cut it early and got about 2½ tons to the acre, the first cutting. The second growth was killed. The seed did not ripen, the rust struck it so I did not get any seed of value. I was very much disappointed. I thought the whole thing was going to be a failure. An expert from Washington came up to see it and he said there was not a particle of seed grown east of the Rocky Mountains this year. There seemed to be something the matter, or something in the seed so that the alfalfa did not blossom.

This next spring the department have asked me to leave the first crop for seed. If I had done that last year I would have got a good crop of seed, but the second growth rusted badly.

Q. How do you get you seed in and how do you get it started?

A. The reason I started to grow it was the government sent me some seed and asked me to try it. They sent to Turkestan, Asia, for seed, where the climate is safer than in Vermont.

I planted two acres of it and then, just for my own satisfaction I planted two acres of native alfalfa beside it. I made the mistake of sowing it in rows, I never would do that again but they were anxious to get the best results and thought that if it was cultivated they would be better able to get clean seed, but I think that is a mistake. I prepared the ground thoroughly; manured it thoroughly and planted it in rows eighteen inches apart.

It came up in the first place and the first season I cut eight tons. I cut it nearly all green, but I had three cuttings. I could not see any difference in the imported seed and the native seed, but the next spring I could tell just as far as I could see it where the imported seed was, it came up so much earlier in the spring and grew so much faster and produced a heavy crop, which I cut green as it blossomed. That is about all the experience I have had with it in Vermont, I have grown it in other places.

Q. Did you inoculate the soil? A. No. The seed that came from the department, part of it is inoculated and part is not, and I do not think when the next growth comes up you can tell where the inoculated crop is growing. I had two of the same kind of clover, one being inoculated and the other not, and I planted it side by side, and with the first crop it was very easy to tell which was inoculated and which was not. I sowed it as early in the spring as possible and should advise some farmer who has a piece of light porous soil, not hard pan, to put a little piece down to alfalfa, there is no question but what it is going to be a success when we know how to grow it. The main thing is in getting it started the first year so the roots will get established. You can buy the seed from any seed man.

Q. Did you get a crop the first year?

A. I got eight tons to the acre the first year and had three cuttings.

Q. How early in the spring did you put the seed in?

A. As early as I could walk upon it. I might say I gave this piece of land extra care. I wanted to give it all the chance

possible; manured it heavily with sheep manure, as heavy as I could plow in.

Q. Did that foreign seed stand the winter better than the native?

A. Not any better only it started a great deal faster and grew faster through the season and blossomed earlier than the native. I do not think there was any difference in the amount of the crop.

Q. Was the native seed furnished by the government.

A. No.

Q. You don't know whether it was northern grown? A. No, I do not know where it grew. I had an idea that it came from California. I had the most wonderful crop of poppies you ever saw, the field was one mass of poppies where I sowed the native seed. I would not try to sow it on poor ground. I should want a soil thoroughly cultivated to make first class seed, and when you get it started it is pretty hard stuff to kill, after you once get it started.

Q. Would it be desirable to sub soil? A. That would all depend upon the soil you were trying to grow it on. I do not think it would.

The president:—This is very interesting but we shall be obliged to cut the discussion short, as we have with us a gentleman from the state of Maine, who says he has enjoyed these meetings thoroughly and has found them very helpful, and now he will help us by speaking to us for a short time. I am glad to introduce Mr. C. C. Thompson, Dairy Instructor of Winterport, Me.

Mr. Thompson:—Mr. President, ladies and gentlemen:—I know you would all a great deal rather hear the discussion in regard to alfalfa than what I may have to say to you at this time. I have no paper prepared and shall only give you a few ideas that have occurred to me since I came to your city. We are interested in the state of Maine in the question of alfalfa. We are interested because so far we have not been able to cultivate it. We hope to find some way whereby we can cultivate it in the future. If I can only get anything from your society that will lead our people to cultivate, or at least try, a little piece of alfalfa, if I can get some of these ideas which they will be willing to take hold of, I am certain that the dairy question in our state will be a great deal improved. I don't want to take any of your time this morning. I want to hear Prof. Hills, whom we have had the pleasure of hearing up our way and feel he is the best man we have ever had doing institute work, and since we have

heard Prof. Hills, we have come to the conclusion that the state of Vermont is something more than a jumping off place.

I have been greatly interested in the papers and in the discussion at your meetings, and more directly yesterday in the paper in regard to the cream gathering system vs. the milk system. In Maine it is common for us to gather our cream inasmuch as we have no whole milk, we cover such large areas it is impossible to get it at the price our farmers can afford to pay. We do not make the quality of butter you make in Vermont, but we have something of a reputation in regard to the sweet cream we are making. We feel there is a reason why we are not making the good butter. We believe we can make as good butter as you can if we would only put our effort into that instead of putting it into our cream business. It seems to me that the cream gathering system has some and perhaps many advantages over the whole milk. In fact I am able to see but one point where you can make any account of your whole milk system and that is in the quality of your product. It was suggested in the discussion yesterday that the butter would sell at a cent a pound less in the gathered cream factories than the whole milk factories. If that is true it has cost at least a cent and a half a pound more to gather milk than it has to gather cream; allowing we are not getting as much by a cent a pound for the butter made from cream as from milk, we are then making a gain of a cent and a half a pound. I am not willing to admit the quality cannot be kept just as good with the gathered cream as with the whole milk. I will not say it is as good, I don't think it is. I believe the factories are making a little better quality. If you take your milk from the cow and separate it, using the ordinary care every dairyman would use with his milk in taking care of his separator and with his cream after it is separated, I think there is no reason why the quality will not be just as good with the gathered cream as with the whole milk.

If you send your teams out to gather as they do, in some places, both the milk and the cream, gather milk from some patrons and cream from others—if you do this every day you are still making a saving in the expense and there is no reason why the quality shall not be and is not, just as good.

Now you people have discussed this a great deal more than it is necessary for us to discuss it, it is a condition which you have lately changed and, as I understand it, not necessarily, from the whole milk to the gathered cream.

We have never had this change come upon us. We started in practically this way, our effort has been along the line of improving the quality of our cream as it comes from the farm. We have not had to discuss whether it should be milk or cream,

but we have had that one idea of keeping that cream and getting it to the factory in a condition that will go into our sweet cream trade. If we are going to put this cream on the markets in the sweet cream form, it must be in a condition to pasteurize at least; and that means it must be pretty nearly perfect. We have had some defective cream, everybody must, but the defective cream is the thing we are working on; that is one thing I presume my present position was created for, to get at this idea. Our work is with the creameries and patrons. Those patrons who are a little slack and who lack interest, are the people we wish to see and we wish to instruct them and encourage them and have them understand that they are part of the factory.

I presume you dairymen all think you are patrons of the creameries in your state, whereas you are a part of that creamery. You have a butter maker so he can make your butter cheaper than you can yourself, but he cannot make good butter unless he has good cream. It is necessary for all of us to get that idea fully in our minds, if we are going to have a creamery which is able to pay us high prices. We must get high prices, and in order to do that it must be of first quality, and the farm, the dairy, is the starting point of the quality of the product. I am not going to take up any more time in discussing this, there is one other matter I want to speak of to the creamery men of the state, and that is in regard to the association and organization of our creamery men. Two years ago the department called together the creamery men of our state and urged upon them the necessity of organization and co-operation to improve the quality of the product. Now the same thing is true in Vermont that is true in Maine; that is, that you have fierce competition and may have many teams over the same route. You have one patron who is furnishing defective cream; the man who has him does not want him, but the other fellow will take him, because he is looking for business, when he goes and he takes other neighbors with him. That was the very thing we wanted to get at. We had the association formed which includes 90 per cent. of the money invested in the factories in our state. The very first thing they agreed upon was that they would not accept any cream, defective cream at the same price that they paid for their perfect cream. That is the condition the creamery men, farmers and dairymen should be united on. They have made a rate of three cents a pound for any cream received in a defective condition and they have kept their word. When a man comes with defective cream his attention is called to it, he goes to the other creamery and they tell him that they cannot receive that product at the same price as good cream, they will make a reduction,

In one factory which I have in mind they have kept a record of the number of pounds of defective cream for the last few years. Where in 1903, 11 per cent. of their product came defective, only 1 per cent. of their product came defective in 1904. The report from one creamery showed they had reduced the amount of defective cream 75 per cent.; another record showed they had reduced it more than 50 per cent. Every factory that has reported has reported a reduction in defective cream.

Some people at first thought it was a sort of a trust, but it is a trust that is formed for the benefit of the very men who were opposed to it. It was thought it might be possible to have the price regulated and controlled, but that was impossible with us, and I presume it is with you because they have got productive creameries and they pay whatever is left after paying the expense. If you have a proprietary creamery they are obliged to pay the same prices or they do not get the business. So I say it is impossible for one creamery to do an injury to the other in this matter, and the matter of trusts cannot affect the price as they improve the quality of your product.

There is but one thing in regard to the co-operation of the association that may work harm and that thing is the idea of some creamery man will agree to do this and then not stick to his bargain, that is the only thing and that, so far we have escaped.

There was one hint made yesterday that seems to me should not have been said and that was in regard to the creamery man or factory paying more to some individual patron than they were paying to others. The most serious condition we have in our state is with the fact that the people haven't as much confidence in the Babcock test as they ought to have. You people know that can be used to determine the amount of your fat, and you farmers are coming to know pretty nearly how much your product amounts to. The man who is over-paid realizes that the creamery man is not honest, he is going to watch him, because if over-paid now he will be underpaid next month. Our creamery men should see to this matter that the test is used in such a manner that every man gets his just dues. I believe, if anything is going to help out the dairy business with us it is when our people know, as it is their duty to know, how much product they are selling, and watch the creamery man as they watch anybody they do business with, then they would succeed in establishing a confidence which is absolutely necessary if they are going to increase the business.

I thank you for the cordial manner in which I have been received into your state. I have a great many new ideas to carry back to Maine and I trust if any of you have an opportunity

to come over and visit us you may see some of the results of this meeting put into effect.

President Bruce:—The next paper is "Some things science has done of late for dairying," by Prof. J. L. Hills of Burlington.

SOME THINGS SCIENCE HAS DONE OF LATE FOR DAIRYING.

Mark Twain in his inimitable "Roughing It," tells us of a revolver which "if it didn't get what it went after would fetch something else." Concerning it he further remarks that when fired "there was no safe place in all the region round about but behind it."

Now my talk to you this morning bids fair to be somewhat like this "dismally formidable" weapon. It is a scattering discourse, and there is "no safe place in all the region round about it;" for it is aimed at the man beside the cow who milks her and the man in front of the cow who feeds her; at the man who separates her milk, and at him who churns the cream; at the cheesemaker, at the creamery manager, and at the maker of market milk. You are all in line with its muzzle, but luckily it is not loaded with fault finding, but with facts. What I have to say breathes of optimism rather than pessimism. The message of modern science to dairying is helpful and inspiring, though it often lays upon the individual a greater responsibility because of increased knowledge.

What are some of the things which science has done of late for dairying? Let us at the outset get a clear conception of the meaning of the word science. The last generation of farmers almost to a man balked at it, and many to-day look askance at it as in no way allied to or helpful in the pursuit of their calling. This attitude seems in part due to misunderstanding as to what science is and does. Science indicates the results attained in the search for truth, grouped in such a manner as will aid in showing their relationships. Science, in other words, is "an orderly arrangement of well ascertained facts." Certain results of research may seem at times to have absolutely no practical bearing. But we should remember when tempted to style any such work as useless that that which is derided by one generation as impracticable, or, indeed, false, often becomes an everyday affair in the next. For instance, the inventor of photography was placed in an insane asylum because he claimed he could transfer his likeness to a tin plate; Franklin's notions as to the nature of lightning were laughed at; and Galvani was called a fool and "the frog's dancing master" because of his study of galvanic electricity.

Science does not pretend to say the last word. It formulates theories to discard them as new discoveries lend further light. It, like practice, is ever an evolution. Hence it follows that I may tell you some falsehoods to-day; nothing that I know to be such, yet, notwithstanding untruths. My statements represent what I believe is held to be true to-day, but which 20, 40 or a 100 years hence may be otherwise regarded. This does not imply that present conceptions though perhaps erroneous are useless. They may prove helpful, even if not immutable.

To cover all that science has done even in this one line, were impossible. One must draw the line somewhere; hence I speak only of "some things" which have been done "of late." My talk on this account is disjointed rather than connected, and suggestive instead of didactic. I shall take it for granted moreover that you have a grasp upon certain of the fundamentals, for a dairymen's meeting is on a higher plane than an institute. It is the high school as it were of the farmer's instruction, and consequently we may assume something for most of those who attend its sessions.

What are some of the points which have been developed touching the feeding of dairy cows?

1. The limitations of feeding standards are better understood and the German standard-balanced ration protein statement is under review.

2. The home growing of protein is a more practicable thing, thanks to soil and seed inoculation with nodule-producing organisms.

3. The "best" grain feed is better known.

Professor Haecker of the Minnesota Station is emphatic in his belief that we feed cows too much protein. He shows several animals with good records which for years had eaten only 1.5 pounds of digestible protein daily. Five years' study at Burlington of the relationship of varying grain rations to profit and to bovine well-being as well as a survey of work elsewhere leads me to believe that the German balanced ration's call for 2.5 pounds of digestible protein is usually an over loud cry. One the other hand I am not yet ready to accept Haecker's data as applicable in the East. In fact among the later dictums of science is found the notion that feeding standards resemble India rubber rather than cast iron, that they are helpful as guides rather than as rules, and that protein is not, in the slang phrase, the "whole thing." Feeding standards are differentiated into:

1. The physiological, which are based on animal needs and maximum production, and are couched in mathematical terms; and

2. The practicable, which are essentially home made, based upon and guided by the physiological standards, and which are moreover less variable according to circumstances. Such a conception of the feeding standard proposition enhances their usefulness to the careful feeder.

Protein must be fed our cows, however, whether Haecker's ideas prove sound or fallacious. Vermont farmers may be able to grow the equivalent of 1.5 pounds protein daily on the farm if weather conditions favor and advantage be taken of one of the latest triumphs of science, perfected in the laboratories of the National Department of Agriculture.

Moore's soil and seed inoculation, concerning which so much has been said of late in the press, bids fair to become a practical success. His cultures of the nodule-producing organisms have been grown under conditions where they have had, as it were, to struggle for existence. The survivors are emphatically the fittest, and are many times more active in nitrogen gathering than were their bacterial forbears. Clover and alfalfa crops grown from inoculated seed are the better because of the treatment; the forage is richer and there is more of it; the ration may be thus enriched in protein, and the dairyman to some extent relieved from the necessity of grain purchase. The cultures are readily used; the directions are simplicity itself; the results are positive; and the cost is one cent for a postal card, a hundredth of a cent for ink, and a minute's time.

What is the "best" grain feed for cows?

There is none expressed in terms of pounds or measures of roughages and concentrates; but there are many thoroughly good ones. If the grain ration carry protein in sufficient quantity, is made up of three or more ingredients, all palatable, none injurious to the milk and its products, and one of them at least mechanically a lightener of the ration,—as for example wheat bran or distillers' grains,—it may be expected to be physiologically as good as the best. If, then a trained judgment and a due regard to economy enter into the formulation of the ration, one cannot go far astray. Five years' work at Burlington with restricted and with heavy grain rations of all sorts, as well as the study of the results of similar work elsewhere, leads me to believe that given:

1. A class of cows making 250 or more pounds of butter,

2. Plentiful supplies of early cut hay, carrying some clover, and of mature corn silage or apple pomace silage,

3. Grain prices as they rule to-day;

that a six-pound grain ration of judiciously chosen by-products is in the long run as close an approximation to the best as we are likely to arrive at in this vale of mystery and doubt.

What has research discovered of importance to the milker?

1. An apparently successful and practicable milking machine.

2. Further insight into the losses due to incomplete milking.

I saw some little while ago a milking machine which has been in practical operation in a large herd for over a year and with apparent success. This machine seems simple, is readily cleaned, does not irritate the cow, strips better than the average milker, is rapid, but I judge is likely to prove costly. It goes without saying that a mechanism of this kind fills a long felt want. If, as it would seem, its inventor can really cry "Eureka;" it is a marked triumph of applied mechanical science.

I just remarked "strips better than the average milker." It is well known that the average milker gets less milk than he who does a thorough job, that incomplete milking means not only direct but indirect loss, not only an immediate lessening of the fat yield, but tends towards drying the cow. A Danish scientist has recently developed a special system of udder manipulation, a sort of massage of the mammary gland, as it were, which it is claimed augments the flow. The Hegelund method, as it is called, involves three manipulations, each thrice repeated or until no more milk is obtained; first the pressure of the quarter on each side against each other thrice repeated, followed by removal of the milk; second, the pressure of the glands together on each side, the forequarter being first manipulated and then the hind quarters, followed by removal of the milk; and, third, the fore quarters are pressed between hand and body, the hands holding the teats loosely, then the hind quarters also, followed by milking.

Trials of the scheme made at the Wisconsin and New York stations afforded a daily average increase per cow of a pound of milk and two ounces of butter. The after-milk was very rich in fat, testing about 10 per cent. This after-milking takes not to exceed five minutes' time—often only two or three minutes. The two ounces of butter may be held at a low estimate to be worth two cents. This would be a fair pay for five minutes' work, 24 cents an hour and the skimmilk thrown in. Not only is more milk and butter made, but the secretion is stimulated and the lactation period prolonged.

It may be remarked, however, that the differences in milk and butter yields between this method and careful stripping are not great. This Danish method, however, does emphasize, more perhaps than has hitherto been done, the actual and potential losses due to incomplete milking.

"What has science done for me?" asks the man who runs the separator.

Nothing perhaps to make his lot the easier, but something that may enable him to deliver better cream to the butter maker; for it has given him a means of detecting poor milk, and of judging cream at the weigh can. This proposition is nothing new. It is nothing which the operator will be likely to adopt of his own initiative, for it spells turmoil to him; but some day it will come. A scheme of this kind seems more called for nowadays as a cream grader than as a milk detective. Infrequent deliveries or collections and inadequate attention given the product at the farm made decided differences in actual butter values which are not measured by the Babcock. The test is easy. A pink tablet of alkali dissolved in a pipetteful of water is mixed with a pipetteful of cream. If the fluid remains pink the cream grades 1, being relatively sweet; if the pink hue fades out, the cream grades 2, being relatively sour. The two creams, for there will be many of each, may be ripened and churned separately and paid for on the basis of returns, or a discount of a cent a pound, say, may be made for No. 2 cream. The system is in vogue in some creameries. It's an educator; also a trouble breeder. Keep thinking about it!

Perhaps our friend the separator operative thinks his machine takes out the bacteria. He may be excused for thinking so, for does not one of the largest of the separator companies so advertise? The solid impurities are thus largely removed, but not the bacteria, according to Iowa Station's trials in which roughly one-third of the bacteria appeared in the skimmilk, one-fourth in the cream and rather less than one-half in the separator slime. Neither was it found that the keeping qualities of either the cream or the skimmilk were at all bettered as a result. As a clarifier in the sense that it may remove tangible dirt, centrifugalizing milk is a success as a cleansing process; but dissolved dirt and bacterial dirt are but little affected.

What aid has been vouchsafed the butter maker in his endeavor to make extras?

1. Pasteurization for butter making has been popularized and made more practicable.

2. Dairy salts have been thoroughly investigated as to their purity, their mechanical properties and their comparative values.

Pasteurization has had vogue for several years. It is no new proposition, but there have been of late some points developed on which it is worth while laying some stress.

In the first place we recognize two sorts of pasteurization of dairy products nowadays—using the term in the broad sense—one carried out as against pathogenic or disease producing organisms and one aimed solely at those which impair keeping qualities. The first of these is meant to be a completed operation, the second, an incomplete one. Each has, however, a distinct and definite purpose. Now it is only with the latter that the butter-maker has to do. His subjection of large volumes of milk or cream to the influence of relatively low temperatures for a short time in some of the many continuous forms of pasteurizer improves but does not make perfect, gets rid of many but not of all the organisms. The more modern mechanisms seem calculated rather to lessen labor and expense than to insure the death of all of the “bugs.” For the distinct purpose in mind, to better the keeping qualities of the butter this is probably evolution in the right direction.

A recent suggestion from a western dairy school seems pertinent—it is that the wash water should be pasteurized. It often happens—more often than not perhaps—that creamery water supplies are not as pure bacteriologically as they should be. What avails it to pasteurize the cream and then wash the butter in a germ laden water? To be sure one is not quite as apt to get so large a variety of posies in his bouquet as if he used no effort to improve the situation, but their numbers may be very great. At any rate, experiments at the Iowa Station indicate that an enhanced keeping quality was obtained when the water was pasteurized as well as the cream. Filtering the water through stone, sand, coke, charcoal and gravel also helps.

Dairy salt serves four purposes in butter and cheese making.

1. It expels buttermilk or whey.
2. It augments the keeping qualities of butter.
3. It serves to promote the ripening of cheese.
4. It accentuates flavor.

Nearly a million dollars' worth of dairy salt is used yearly, most of it of domestic origin. Good salt does much and poor salt does more to affect the grade of dairy products. How do the many sorts offered us serve us?

Salt is a combination of chlorin and sodium. But all salts are not all salt. Indeed, no salt is all salt, as each brand carries more or less impurity. The average American made dairy salt carries 98.3 percent of true salt and 1.7 percent of impurities, of which 0.2 percent is moisture, 0.1 percent magnesium chlorid,

0.3 percent calcium chlorid, and 1.1 percent calcium sulphate or gypsum. The magnesium and calcium chlorids have a bitter taste. In the quantities ordinarily present they apparently exert no ill effects on fresh butter, but they do sometimes damage storage goods. They seem to cause a slow decomposition of the butter fat. The gypsum is not only undesirable as a diluent but because it tends to cause salt to cake. Other things being equal, a salt that is relatively free from these impurities is to be preferred. Other things may not be equal, however, for the size of the grain, its shape, its apparent specific gravity and its solubility are important factors. The finer the grain, the greater its weight in a given volume and the more ready its solubility. Thus in a series of trials of fine and coarse grained salts, the former owing to greater solubility passed more readily out of the butter during working and proved the less economical. An ideal butter salt should be pure white, of a uniform, thin, flaky grain of medium size, without ill odor, and be nearly free of the bitter salts and dirt. An ideal cheese salt may be similarly described save that the size of the grain may be larger. No one brand stands first in all these respects. "There are others" than the one you use.

Wherein has cheese making practice been put upon a higher plane by scientific investigation?

1. The phenomena of the ripening processes are better understood.

2. Canned cheese, paraffined cheese and cheese prints have been developed.

The changes brought about by cheese ripening have been in part determined within the past few years. Up to recent times hypotheses were plenty, but facts few. It was thought that bacteria ripened cheese, but the process seems more likely to be at best but in part bacterial. It is now deemed that the natural and inherent enzymes of the fresh milk,—galactase and its associates,—and the pepsin of the rennet extract, or the scale pepsin of the drug stores which is now used in lieu of rennet in some factories, are also important factors; that all three working together are probably the main ripening agents, but that the environment of the ripening cheese more than any other one thing gives character to the final product.

A number of interesting points have been brought out of late which must need be but barely referred to. The underlying reason for the hot iron test, the causes of slimy, slippery curd, and of "leakiness," the rationale of the quick ripening and the slow ripening cheese processes having been developed; and the relationships between temperature, moisture, varying amounts

of rennet or salt, on the one hand, and flavor and texture on the other, have been determined and the causes worked out. In short the Wisconsin and New York Stations are doing the cheese industry a mighty service in their abstruse, high technical work and affording excellent examples of the practicability of pure science.

Europeans eat cheese; Americans taste it. The consumption of cheese in this country is relatively small. It furnishes only 0.4 per cent. of total food, 1.6 per cent of the total protein and 1.6 per cent of the total fat of the average American diet. There are several good reasons for this situation. One of them is the small proportion of the cheese made in this country, which is put up in convenient form. The bulk of it, probably 99 per cent. of it, is marketed in slices, cut by the pound from large cheeses, slices which fail to keep well owing to the large surface exposure to the air. A more convenient and attractive method of marketing cheese ought to increase its consumption. Canned cheese and print cheese are two recent contributions towards the solution of this problem.

Print cheese has been for years made at the Wisconsin Station. The ordinary cheddar curd is placed in a rectangular mold and printed by pressure. Any form and size of print may be used. The Wisconsin block contains 30 one-half pound prints each 2.5"x2.5"x2.25", entire blocks being roughly a foot square and 2.5" thick. It seems practicable to handle this class of cheese in the horizontal press. They cure as readily as ordinary cheddars, develop a good flavor and texture, and may, like butter prints, bear an identifying mark which will aid in sales. Such a cheese, if of good quality, ought to sell not only because of its novelty but on its merits.

Cheese may be canned as green curd and ripened nicely in the can. At the Oregon Station two and one-half, five, and twenty-three pound cheeses have been thus made which are without rind or mold, which lose no weight in curing, which after ripening keep for months, which stand shipment across the Atlantic and back, or to China and back, and open upon return in perfect condition. The cans are thoroughly paraffined within, the cheddar curd after milling and salting is either filled and pounded in and then put in press, being sealed the next morning; or, else, the curd pressed in the usual manner is the next day slipped into big cans made to fit and sealed up. Cheese thus canned needs no further attention save that of a low and fairly constant temperature at about 60° F. A high temperature or a variable one, particularly when the cheese is young, ruins it. Some of these canned cheeses are being made to-day from milk which

has been inoculated with specific aroma producing organisms. The possibility and practicability of controlling the flavor of the ripened cheese as the result of using certain organisms has been demonstrated. It looks as if in the near future special brands of canned cheeses of guaranteed quality, of specified and excellent aroma and flavor, in specially labelled cans, cheeses without rind, every bit edible, well ripened, of friable texture, in short, a delicate and superior product will be offered to the retail consumer. It looks as if this might solve the family trade difficulty and promote the use of this valuable, digestible, concentrated, and under-used food.

Possibly Mr. Ruddick spoke on Tuesday concerning paraffining cheese. Even though he did so it may be worth while again to revert to it. Cheese of the cheddar or stirred curd type, dipped in paraffin at temperatures from 180-250° F., for a moment, and allowed to drain a few seconds, is coated thus with an airtight, impervious coating which lessens the loss of weight in ripening, prevents the growth of mold, improves its appearance, lessens the proportion of rind from about 12 per cent. to 3 per cent. So far as observed, this in no way interferes with the ripening process or deteriorates the flavor or texture of the cheese. This modification of the process seems particularly adapted to the cold cured goods which are to be the coming cheese.

Has science done anything to make the factory manager's job more of a bed of roses?

Not that I am aware of. It has, however, added to his information. It has shown him the injustice which he is often doing his cream patrons in not weighing the cream samples prior to testing. It has indicated some of the errors that are resident in careless methods of sample taking and handling. It has, however, for his comfort, vouchsafed some explanations for the great variations which naturally may occur in milk and in cream from the same dairy,—explanations which no doubt do not always satisfy him whose test drops, but, still, fairly satisfactory explanations.

"What makes the milk test vary so?" is still a burning question, though less so than it used to be. I sometimes wonder whether it is because dairymen understand it better, or because they are hardened to it, or because more accurate sampling and testing and better informed operators and better mechanisms have lessened the proportion of incorrect testing, or whether the judicious use of a lead pencil in the office "evens things up." I do not know; but this I do know that any intelligent farmer who

wishes can own and run a Babcock and tell himself the truth if he is careful and informed, but not unless he is careful and well informed.

May market milk be bettered by aught that science has done for dairying,

Yes, for now are better understood than of old:

1. The principles underlying stable ventilation and the causes of its failures.

2. The sources whence are derived the organisms which cause annoyance, loss of products or disease; also how to avoid the damage they do.

3. The dangers of "doping."

The topic of stable ventilation was to some extent ventilated at the last Montpelier meeting of this association. Since much animal disease is due to housing in ill ventilated stables, it is a dollar and cents proposition to try and better this condition. Too little oxygen and too much carbon dioxide; too little air, too much exhalation from lungs, skin, manure, etc., are conditions which promote the growth of disease germs and impair vitality. A cow needs hourly 3,542 cubic feet of air, a horse 4,296, or amounts of air which fill a space ten feet high, ten feet wide and 35 to 43 feet long. Theoretically perfect ventilation is neither practicable nor necessary; but the conditions may be better in many barns.

Every barn is a problem unto itself, because of differences in shape, distribution of contents, contour of land in its vicinity, relationship to the direction of prevailing winds, number, location and character of animals, etc. However, some of the principles which have been worked out are suggestive and helpful. These are:

1. Entrance of the fresh air near the ceiling of the stable by an indirect line, or by conduit into the barn near the cow's mangers.

2. Removal of the foul air from points near floor or near ceiling, either exit to be available as needed.

3. As straight, tall and simple a stack (ventilator) as practicable; as few angles as may be in side shafts; no horizontal lines whatsoever. In fact a good ventilating shaft should be as near an approximation to the form of a chimney as is practicable; should be airtight, should rise high above the roof, be located as near the center of the stable as may be and should have a liberal cross section. It is a good notion to sheathe a metal ventilating flue with wood and to use building paper on a wooden one. A chilled chimney does not draw well; and the chilling of a barn ventilating flue seriously impairs its efficacy.

It has long been known that the fodder and the bedding, the exterior of the cow and her milker, the utensils and the dairy, were all sources of the bacterial contamination of milk. It has been taught until recently, however, that the cow herself, if healthy, was not guilty; that her milk as it was drawn from the udder was free from organisms if the fore milk was rejected. This is now known to be not quite true. She does contribute a small quota to the general assemblage; and all the cleansing of barn, and dairy, and occupants will not avail here, for we cannot cleanse the inside of a cow's udder. But we may deter almost all of the organisms from entering.

There are three ways of fighting the bacteria in milk.

They may be kept out.

They may be killed out.

They may be caused to commit race suicide. The policies of exclusion, of destruction and of isolation! All good—but the best way and one not of necessity expensive is to exclude them.

Now I do not mean again to rehearse the story of cleanliness in the dairy. I do want, however, to say a word or two about the sanitary milk pail.

Much of the dirt, tangible and intangible dirt, that which may be seen on the cheese cloth strainer, and that which dissolves and passes through—dandruff, hairs, flecks of dried manure, bacteria and the like that get into milk—fall in from above during the process of milking. Now straining milk through cheese cloth only removes a part. The situation can be bettered to a marked degree, the keeping quality of the milk be enhanced, and the likelihood that the milk will make good butter be increased by attention to a few details that are neither costly in money or time, or difficult to install.

1. Wipe udder and abdomen with a damp cloth immediately before milking.

2. Provide milkers with clean clothes.

3. Fill seams of dairy utensils with solder and use some form of the sanitary or dirt-excluding milking pails. There are several forms of the latter. One is a covered pail with a 4" funnel covered with wire gauze into which fits a loose ring whereby may be fastened in a few layers of cheese cloth. Another is a closed pail with a large opening covered with a wire mesh and absorbent cotton. And still a third and very practical pail is one with a shoulder and a hood which is otherwise open. According as this is held the amount of dirt entering the pail may be cut down from 60 to 90 per cent.

If now after the organisms have been thus excluded their growth and multiplication are checked by low temperatures,

one may feel fairly certain that the milk will have a lease of life almost as great as that of a ton of coal during a cold wave.

Congressman Adams at the Burlington meeting, discussing pure food legislation, denounced doped milk. It is one of the dangers of the market milk trade, one of its great temptations. What is science's latest say-so as to embalming processes?

Dr. Wiley of the U. S. Department of Agriculture has contributed the first piece of positive information we have had on this subject. Claims and counter claims have been made as to the harmlessness or harmfulness of chemical preservatives. He, however, is in a fair way to settle the matter by direct experimentation with his "poison squad," a lot of young men of vigorous health to whom under careful restrictions and constant medical supervision the borax compounds, common preservatives, have been fed. Without going into details it may be remarked that it has now been amply proven that considerable quantities of borax or boracic acid are inimical to digestion and to health; that minor quantities are more or less, or at times perhaps, not injurious to healthy adults. These preservatives are undoubtedly less dangerous than the ptomains which may form if the materials remain unpreserved, yet they do not form when care and cold are used. Science has put its seal of disapproval on the use of preservatives unless the existence thereof is advertised on the container of the goods.

I have taxed your patience for a long time this morning; yet I have only outlined a few of the many contributions of research of dairying. If you would know more of them, would study any phase of the subject, ask and I will gladly direct you to literature if I am acquainted with it.

Now with what exhibition of oratory and rhetoric shall I close? A preacher having talked long and prosily to a lot of children finally said: "Now, little folks, what more can I say for you and do for you?" A little lad in the front row piped up "Say amen and sit down." Amen means "so be it;" and so most heartily to everything scientific and practicable that makes for dairy advancement say I "Amen"—and sit down.

Mr. C. F. Smith:—I would like to ask you how that milk pail differs from the Gurler milk pail.

A. The Gurler milk pail is completely covered. It has a strainer of fine wire mesh under which are fitted layers of absorbent cotton. The pail I am speaking of is open, has no absorbent cotton and no wire mesh, but simply a tin shoulder or hood covering over three-fourths of the pail and shielding it from the rain of dirt from above.

Q. Is the hole you milk through about the same size as in the Gurler pail?

A. I should say that the orifice is smaller than that of the Gurler pail. It is not difficult to use and it keeps out 90 per cent. of the bacteria.

Q. Is it a patent pail?

A. Not so far as I am aware. Any tin man can make it.

Mr. Smith:—Would you advise an average dairyman to use absorbent cotton?

A. Mr. Gurler gets 10 to 12 cents a quart for milk. He can afford to use it; but I doubt if it is wise for the average farmer to do so. He will prefer the pail I have mentioned even though it is a little more difficult to clean than the common pail. Do you use the Gurler pail, Mr. Smith?

Mr. Smith:—I have one but do not use it right along.

Q. Do you place this pail above the Gurler, if you were doing a high grade work?

A. No. I know of no pail as good as the Gurler because absorbent cotton is the best medium extant for keeping out bacteria; but its cost makes its use impracticable to the ordinary man.

Q. Tell us something about the bacteria of alfalfa.

A. The micro-organisms which are prepared by the Government live in a sort of co-partnership with legumes. They are sent in a package by mail containing two powders and a fluff of cotton batten. Their use is simplicity itself. Place the cotton fluff (which contains the bacteria) and powder No. 1 in a pail of lukewarm water and let it stand (warm) for twenty-four hours; then add powder No. 3 and let stand another day, still keeping the water warm. The fluff contains the bacteria, and the powders are plant food. In forty-eight hours the water will look like whey and there will be countless myriads of bacteria swarming therein. Then immerse the seed, moistening it and then spread on a dry floor to dry. Every seed will thus be inoculated with the organisms. It is general experience that inoculated seed does better than the uninoculated seed.

Mr. Jenne:—Would it pay to use this process?

Mr. Hills:—Yes. The work takes only a few minutes, does no harm and always does good.

Q. Should this process take place just before sowing the seed or at any convenient time?

A. Whenever convenient. The bacteria can lie dormant on the seed for several years.

Q. Where did you send to get it?

A. Department of Agriculture, Washington, D. C. Ask for inoculating bacteria for the specific crop you want to grow. Only legumes are thus treated. Grass, corn or cereals are in no wise benefitted.

Q. How much more should the cream patron receive than the milk patron per pound for butter to do justice to each?

A. Experiment Station bulletin 100, published in July, 1903, discusses this whole proposition. It varies according to the richness of the cream. From three to three and one-half per cent. extra surplus should be allowed to the cream patron, provided scales are used to weigh the pipette delivery. It is absolutely impossible correctly to analyze cream that tests more than 25 per cent. fat except by weighing the pipette delivery. It is all a matter of guesswork, if weights are not used.

Q. How do you arrive at the conclusion that three to three and one-half per cent. surplus should be allotted the cream patron?

A. It has been worked out both in theory and in practice.

Member:—A certain creamery that I know about takes the ground that the loss to the patron in the skim milk is the only factor which should enter into the matter.

Mr. Hills:—Let us reason about this. A. brings cream; B. brings milk. A's sales product, i. e., cream, is subject after purchase to two losses of fat, one in the butter milk and the other in mechanical ways. B's sales product, i. e., milk, is subject to three losses of fat, in skim milk, in butter milk and the mechanical loss.

Separator manufacturers claim that their machines skim to 0.01 per cent. As a matter of fact rarely do they skim to less than 0.10 per cent. This loss is equivalent to two or more per cent. of the butter fat, which enters the creamery in the shape of milk, lost in the skim milk. This accounts for two-thirds of the three to three and one-half per cent. Then again; the more concentrated the product, and the less it spreads over, the less the mechanical loss, other things being equal. These two are the main causes of the three to three-fifths per cent. gain on cream.

Q. Are these conclusions based on theoretical reasoning, or are they exact facts as they exist in creameries today?

A. Both. I have just given the theoretical reasoning, and it has thus worked out in practical experience.

Q. In determining these figures do you take into consideration the fact that cream deliveries are inferior in quality to the whole milk deliveries?

Mr. Hills:—No. Creamery managements sometimes argue as follows. Smith, who brings us cream ought to have a larger surplus than Jones who brings milk, but he brings a poorer article than does Jones: so we will even it up by not giving Smith the extra surplus. Such reasoning is incorrect and fallacious. Two wrongs do not make a right. What ought to be done is to give Smith his extra surplus and then, if he is bringing second

grade cream, dock him accordingly. That is the scheme now in vogue in some creameries.

Q. Your statement is theoretically correct; but what are we to do with two or three creameries in close competition and the patron saying, "if you don't take my cream the other man will?"

A. A hard proposition. Creamery men ought to form a get-together club and stand by each other; but they don't, and I fear they never will. We have far too many creameries in Vermont.

Q. Is a patron bringing 30 per cent. cream entitled to a larger surplus than one who brings 20 per cent.?

A. Yes. He who brings the richer cream theoretically should be allotted a little more surplus than he who brings thin cream. The difference, however, is but slight, too slight to be worth fussing about.

Q. Is the chemist's gravimetric skim milk test absolutely correct?

A. It is more nearly correct than any other test. It always runs high of the Babcock. I believe that I have never seen one showing less than 0.07 per cent. fat and I have made many hundreds. The Babcock test of skim milk understates the fat content, decidedly if carelessly made, slightly even if made with the utmost care by a competent operator with good apparatus properly run. This statement is not true, however, of whole milk analysis. The Babcock tells the truth with whole unity if it is given a chance to do so.

President Bruce:—The hour for adjournment has arrived. Meeting adjourned.

Thursday, P. M., January 12, 1905.

President Bruce:—It is necessary that we come to order now and proceed with the business. Mr. Towle of Franklin has the permission of the officers of the Association to present a resolution.

The following resolutions were then presented by Mr. Towle:

TESTIMONIAL OF REGARD.

Whereas, there is still living at his home in Georgia at an advanced age, Mr. Orvil S. Bliss, the originator and founder of the State Dairymen's Association, which has since been in most successful operation for thirty-five years, and, whereas, he was the secretary of this Association for a long term of years and labored earnestly, diligently and unremittingly for its welfare and success before any regular state appropriation was made for its maintenance, and succeeded in carrying it forward against

many disadvantages, until it had taken a front rank among similar associations in the United States—therefore, Resolved, That in convention assembled we take this opportunity of expressing our hearty appreciation of the exceedingly good work performed for the dairy interests of our state, and indirectly to that of the other states, by our friend Mr. Bliss in the earlier history of this Association, and who is not now able to be with us.

Resolved, That these resolutions be placed with the records of the Association and a copy sent to Mr. Bliss.

E. R. TOWLE.

A. J. Croft:—I take pleasure in moving the adoption of the resolutions. I think it would be only a mark of due appreciation.

Mr. Eddy:—If the gentlemen who just spoke will allow me to suggest that a copy of these resolutions be sent by the secretary to the gentlemen, Mr. Bliss, I will second the motion.

Motion put to vote and the resolutions were adopted.

Mr. Towle:—I thank you very much for the expression of appreciation on my part, also for my old friend, Mr. Bliss.

The president:—We will now listen to the report of the committee on resolutions.

Mr. Eddy:—Your committee beg leave to report the following resolutions:

Resolved, That the Vermont Dairymen's Association, at the close of its 35th annual meeting desires to express its appreciation of the many accommodations and courtesies accorded by the city of Montpelier and his Honor the Mayor, which have so materially contributed to its success and enjoyment.

Resolved, That this Association regards with favor the policy of President Roosevelt relating to the control of trusts; and the control and management of the railroads of the United States, as to rates and rebates and interstate commerce matters.

Resolved, That this Association respectfully urges that Congress enact a pure food law, by and under which the producer of food and food materials may be protected against fraudulent imitations.

Resolved, That this Association unanimously protests against any reduction of the existing tax upon colored oleomargarine because such a reduction would work great injury to the butter making industry of the state.

Resolved, That this Association regards reciprocity with Canada with anxious disfavor and earnestly protests against the same upon any terms yet proposed by that country.

Resolved, That a copy of so much of these resolutions as relates to public affairs be sent each member of the Vermont delegation in Congress by the Secretary of this Association.

JOSIAH GROUT,
A. J. CROFT,
C. H. EDDY,
Committee on Resolutions.

The following resolutions were presented by Prof. J. L. Hills of Burlington:

Since the Association last met there has passed to his reward one who stood in the eyes of the world as the official representative of the dairying interests of the country.

The late Major Henry E. Alvord, a product of a New England farm, educated in a Vermont College, a soldier of the Civil War and officer in the regular army, a teacher of agriculture and president of two agricultural colleges, and for the past ten years chief of the dairy division of the National Department of Agriculture, he has been for a generation a leader of agricultural thought and a power in the advancement of dairy interests. He fell at the post of duty, serving the department of the interests of dairying, at the St. Louis Exposition. An able executive, incisive speaker, keen investigator, ready writer and withal a most charming and courteous gentleman, he will be missed and long remembered wherever dairymen meet together.

Therefore be it Resolved, That the Vermont Dairymen's Association hereby expresses its sense of loss in Major Alvord's death, that it instructs its secretary so to inform the family of the deceased and that these resolutions appear in the report of this meeting.

The president:—You have heard the report of your Committee on resolutions. What will you do with the report?

Motion being made and seconded, put to vote the resolutions were accepted and adopted.

The president:—Is there any further business that should come before this meeting?

Mr. Eddy:—This is not particularly a matter of business, but it is a matter that pertains to the dairy interests of the State of Vermont. As the speaker said this morning, I believe in the organization of the creamerymen of the State of Vermont. I believe they ought to come together as an organization; I believe it is not only for our own interests but for the interests of the farmers of the State of Vermont for us to do it. I do not believe, as I told you yesterday, that Mr. A. with the poor cream ought to receive the same compensation as Mr. B. with good cream, or Mr. C. with good cream. I believe we ought to take

some such measures as the gentlemen have taken in the State of Maine. It is for the interests of the farmers of this state to do this, and if there are any creamery men here I should be glad to hear from them.

Mr. Smith:—I do not know that I have thought very much about this subject, but the thought has struck me that as a creamery man I do not want this poor cream at any price, I would rather the the other fellow would have it, and it seems to me that a patron that will not give me cream that will make No. 1 butter, that will command the top market price. I would rather let the other fellow have him for a patron because he is an injury to the creamery. an injury to us at any price. I do not want that, no one else wants it. I want to make first class butter and I do not want a man who supplies poor cream for a patron, that is my standpoint. I do not believe it is necessary for us, as creamery men, to have poor cream or poor milk.

Now, it has been suggested that competition is so sharp that a creamery man would take cream that he didn't really profit by, for sake of holding his patron. Now, I am in the creamery business to stay. I am not in the creamery business for this year, but I am in the business for ten years from now, for all I know. I am working along that line. If I have a patron that is dissatisfied, if he won't bring good cream, if he won't bring good milk and if it is not satisfactory, well and good if he goes to another creamery I am glad of it. I do not want it, and I believe in the end I will get more patronage and more business and that I will make more money, and my patrons will be better satisfied.

Mr. Eddy:—Do you think this method will educate the farmers? Don't you think some one else will take their cream if you do not take it, and that they will keep along making cream that is not up to the standard?

Mr. Smith:—I think my method will educate the patron, because if I can get all good cream I can get all good butter and I shall get a good price for it and I can pay my patrons more than the creamery man who receives poor cream and makes a poor quality of butter and in the end this patron will come to see it, and it will learn him that it is better to deliver good cream and good milk.

President Bruce:—We are very glad to have discussion along these lines. It is important it seems to me that creamery men should stand together. We do not know one another well enough. Competition ought not to be as great as it is, we should stand together.

We have with us a speaker from Maine. You heard him last evening at the banquet and after his address there will be

an opportunity for discussion. It gives me great pleasure to introduce Dr. G. M. Twitchell.

A PLEA FOR THE BUTTER MAKER.

Address delivered before the Vermont Dairymen's Association at Montpelier, Vt., January 12, 1905 by

DR. G. M. TWITCHELL,

Editor of the Maine Farmer, Augusta, Maine.

Vermont is the leading dairy state of the East. It has gained that position by close application on the part of its dairymen to the industry in all its phases. It has now the honor of setting the standard for the eastern market by the quality of its product. Vermont butter to-day represents, in the commercial world, the highest grade brought to its counters. The fact that this has come to be a commercial rating indicating grade instead of territorial boundaries adds to rather than detracts from the honor due the leaders who first established a fact and then brought commercial centers to an appreciation of the same. I am stating here simple truths, and it is a pleasure, as a resident of a sister state, to offer this testimony, patent to every man who thinks, yet lacking full appreciation by the rank and file of workers who fail to realize the constant pressure to be and do the best of which they are capable. The market of today is not satisfied with the standard of 1890, and that of 1910 will demand far more of the butter maker than is appreciated in 1905. Good butter is an educator. It leads to a critical taste and buyers naturally and inevitably come to be exacting as day by day they enjoy the fine flavor and texture of the high grade article. If it is more difficult today to suit the average customer, it is because the butter maker has touched his palate with that delicious and delightful aroma coming only from choice, fresh butter, and the desire is for more. Man is a creature of habit and that which satisfies, he wants in steadily increasing quantity, but in providing that quantity no level can be maintained, for the reason that tastes become more and more acute to please, the standard must continually be raised. Average butter no longer satisfies and for the reason here indicated. Every producer realizes that if he tickles the palate of his customer he increases consumption of the article or product and multiplies demand, that the best always finds ready sale and that the margin of profit is to be found upon the higher levels. Recognizing this fact certain simple, homely lessons present themselves and it is these I would suggest today. The dairy industry is worth annually to the State of Vermont fourteen million dollars. It is represented by 33,104 farmers, 200 butter and 52 cheese factories and 786 cows to each 1,000 population.

Here is the financial basis of the industry, one unequalled by any eastern state, but this tells only a part of the story. More vital problems are behind the figures. The march of invention has not left our agriculture with its kindling torch, neither has the midnight oil in the laboratories been burned without lifting high the flaming banners of scientific research to guide the workers up the hills to broader levels and higher vantage grounds. One law holds rigid lines in all the industrial world and the man who tills his acres or makes the finished product must stand by the side of the mechanic or artisan in every other field or the industry is sure to pass into a state of "innocuous desuetude." You cannot maintain dual standards along industrial lines. Failure to appreciate what is here involved will surely send the industry to the low level where its followers will be simply working for a subsistence, grubbing an existence out of Mother Earth. Accepting this, the fact of the rush and whirl of life presses upon our attention. The past ten to twenty years have lifted burdens from the shoulders of men and placed them upon machines so intricate yet so obedient that he who thinks finds close co-partnership and willing servants. Never has this world witnessed such rapid strides in construction of machinery to relieve hand labor, in means for increasing output or in demands for critical thought as during the last quarter of a century, and in no field of labor has more been gained than in that of agriculture. Everywhere else men deal with machines for the construction of finished out of crude products, here success comes only through partnership with that power which first set the stars in the heavens, and when all "was good" sent man forth to have dominion. That dominion has ever been, and must ever be, mental, not physical, and from the dawn of creation to the present moment results have followed man's upward striving towards clearer conception of that divine law by which and through which dominion could obtain. To my mind there is no hope for the industry, outside of mere toil for a livelihood, except by reaching after the hidden things of farm life and work through the doors which science and invention, backed by experience, indicate as the pathway to larger control.

You ask me to make a plea for the butter maker and it is a pleasure to respond, but in that plea there must fall censure for neglect of principles and practices, understood and appreciated by the man at the factory and the man at the farm. That sense of individual responsibility which makes every man alert to the best there is in him may be lacking in some degree in one or the other and the whole suffer because of it. You do right to demand of your butter makers certain specific acts, for upon their faithful, impartial performance your success as a dairyman depends. You are prompt to criticize failure in any degree as you

should be, for here is the corrective power, but bear in mind that what you insist upon at the factory is possible only when, as a milk or cream producer, you have been as faithful and as exact in the performance of those duties which begin at the foundation of the herd and cease only when the milk or cream passes out of your hands at the factory door. This dual responsibility may well be urged or there is no lesson to enforce.

So interwoven are our lives that success can come only by each and every one contributing to the success of the whole. The farmer who allows his pastures to grow up to weeds and other low grade grasses puts an insurmountable obstacle in the path of the butter maker who prepares the finished product for market. There's a logical sequence to things which has not been sought as it must in the days to come and this essential principle of interdependence calls for recognition to-day as never before. You cannot discuss the butter as a single factor in the industry but as one spoke in the wheel which must be complete in all its parts for that spoke to maintain its position.

We discuss the province of machinery, the necessity for scientific research, the importance of the general laws which hedge the producer of milk, but too often we think of these as separate and distinct, whereas no plea can be made for the butter maker which does not reach back to the beginning and emphasize details, familiar, yet too often forgotten, out upon the farms and in the tie-ups. You look to your butter maker to insure you returns in the market. What provision have you, as milk and cream makers, made for the full performance of your duties in the case? No chain was ever stronger than its weakest link and this chain reaches from the package, ready for shipment, back through the factory or dairy room, past the cream cans and gatherer, to the separator, the milk pail, tie-ups, cow, feed and the man, and the last shall be first in the final score for success. Upon no other than this broad and comprehensive platform can the plea for the butter maker be made, hence I ask your attention to a brief review of those duties and principles so often described, so familiar to all that nothing new can be expected, yet so necessary in the building of the line of offense or defense which has for its final outcome that grade of product known commercially as Vermont butter.

Consciously or unconsciously we must stand shoulder to shoulder with an exacting market, ever lifting its demands before us, calling always for quality, or there is failure and disappointment as the result of our labor. The butter maker is but a single factor in the long line of agents centering in the finished product.

I went to the market the other day for a bottle of cream for the table, which, when opened, told unmistakably that particles

of filth had dropped into the pail at milking time. No butter maker can remove these. There is no known process by which the manure flavor can be extracted from milk or cream after it is once there. Edward Atkinson told the Southern cotton growers the other day that the cotton boll weevil was a blessing if it but stimulated them to activity and insured more of Yankee thrift, enterprise and business methods in the growing of that important crop. So, too, the fact that filth cannot be removed from milk must rank as a help, rather than hindrance, provided those liable to be afflicted are forced to observe the cleanly steps which insure protection.

The man who will not observe these conditions and deliver pure milk or cream must be barred out, for the taint of his milk pail will poison the mass.

On another occasion I obtained a bottle of cream from a grocery dealer, put up by a dairyman, which, after being opened, and not kept on ice, was fresh, sweet and unchanged at the end of five days. That man has no need of a pasteurizer or sterilizer to apologize for his methods and needs no preservative to prevent changes. Under right conditions, intelligent conditions, healthful conditions he is producing pure milk, pure cream and the demand, at good prices, far exceeds the supply.

Given such cream as this the duties of the butter maker become a pleasure and a satisfaction, but to get it something more is demanded than warm barns, clean tie-ups, sound grain and good hay. The line of profit in all departments will, in the immediate future, be found on the upper levels. Mediocrity neither satisfies nor compensates, and if all the butter shipped from Vermont went on the market as Vermont butter, the profits to the dairymen would be very materially increased. Put upon you butter makers the responsibility that attaches to their duties but be sure that all the steps leading to the delivery of choice fresh cream have been taken before hard words are spoken.

Dairying is an industry, not a pastime, and the objective points aimed at by the dairyman are profit from the cows and the building up of the farm. It is well to remember one significant fact, that in every time of business depression, when the fads and fancies of breeding have failed to give satisfaction, when ruin threatened, the good dairy cow and the milk pail have been the salvation of the farmer.

Sweet, fresh, natural grasses, either green or dry, and sound grain have never been improved upon for the making of bone, flesh, fat, milk or butter and if we would give more attention to other matters and less to the protein contents of broom grass and oat hulls, the farmers would be far better off.

If the dairymen would give their attention to growing all the grain, grasses and combinations possible on New England farms this question of feeding stuff would be settled by home production and there would be satisfaction and profit for the milk or cream maker. The solution of the problem of successful dairy work in the immediate future will be found in the study of food elements, in possible combinations, to be grown on our farms rather than in the attractive advertisements or flaming posters or even in the analysis made by the experiment stations. The exacting demands which face the producer of farm products today will not allow of the profits for all the feed stuff wanted going to the western miller or dealer. No man can fix the limit of New England farms for the production of the crops best adapted to the making of milk and butter and until this is fully determined by long conducted tests we are not justified in neglecting the supply which might be drawn from our own acres.

This desire to get something for nothing, to win a prize in the lottery of feed stuffs thrust before the farmer in every conceivable form and made out of we know not what, treated chemically we know not how, and combined to deceive and allure the feeder, is both a snare and a positive evil. The man who makes the combination holds the prize ticket and turns the wheel and the farmer draws the blanks. You ask the butter maker to do a certain work, and probably are frank to criticise if your test drops below what you think it ought to be, but what are you making milk and cream from? Chemical analyses may find protein where the digestive powers of an animal utterly fail. What feeders want is food nutrients measured by healthy digestive and assimilative powers rather than those determined by chemicals. Beyond this is the risk which always attends the feeding of that which is combined and treated by processes familiar to the laboratory, but not always compatible with good digestion.

It is time we gave more attention to the production of normal, healthy food products for our dairy cows and less to the yellow colored literature announcing some marvelous food combination. In proportion as we do this, the problem before the feeder and butter maker will be greatly simplified.

But for the possible increased production of the farm crops resulting from the application of dressing rich in plant food, the outlook for a large per cent. of our milk makers would be dismal. So long as the cream check goes to the grain dealer, the dairyman who depends upon purchased grain has the lonesome satisfaction of an empty pocket book. Seeking quality in the product there must be quality in the food and you cannot improve upon pure, clean, sweet, fresh, natural products.

The refining influences of our present civilization have been purchased at tremendous cost and the natural functions of our cows, created to sustain the life of their offspring, have been so abnormally developed that only the skilled dairyman can enter into full partnership for largest production. Intensified breeding has so magnified the functions of maternity that many a dairy cow is producing yearly ten times her gross weight in milk and more than one-half that weight in butter fats. Such production must be at terrible cost upon nervous energies and such cows to maintain their health, bring forth a calf yearly and hold their record must first of all be healthy in body, possessed of great powers for digestion, hale, hearty and strong, with capacity for large quantities of food. No man can hope to succeed today in the dairy who has not a keen appreciation of the development of the dairy cow and, unless he realizes that milk and cream cannot be forced but must come by invitation. The functions which underlie milk production are beyond the reach of the man who measures by cold mathematics or persuades by the lash or milking stool.

You cannot maintain 300 lb. conditions in tie-ups built upon one hundred pound basis. The increase in possible milk and cream productions calls for a constant readjustment of methods and practices. First of all, the call is for more sunshine, God's greatest disease destroyer, then for fresh air in greater abundance. Tie-ups lighted and ventilated by windows behind the cows, the air coming over manure piles, are disease breeders. This Government, out of pity for the Indians, not many years ago, built, in the far west, a lot of framed houses, made comfortable with stoves and into these the tribes moved, only to find very soon evidences of tuberculosis, which entirely disappeared as they went back to the open wigwams.

Looking for the production of rich milk in quantity sufficient to yield a profit, the health of the cow becomes of supreme importance. Production must be sustained, for competition forces, necessity hedges and ambition stimulates. The conditions of business do not admit of lessening the product, hence there is imperative demand for multiplying the fresh air space around every cow, for providing abundance of sunlight, not on the hind quarters, but the head of every animal, and the observance of every step which can add to the comfort of the individual, or enhance the value of her product. Cleanliness being second only to Godliness, there is demanded its observance as a help to better conditions. It means sunlight and air and it means also clean hands, clean garments, clean utensils, both for milking and feeding. A little dirt in the froth of the milk is a trifle, a little sediment in the bottom of the pail doesn't mean much, a little filth in the separator is a minor matter, but poor quality butter means

trouble for the poor butter maker, yet his hands are tied and he is powerless to correct these slovenly practices which antedate the arrival of the cream at the factory. The conditions which enable the butter maker to do his best are those which insure most to the milk maker, and the plea for the butter maker is backed by the desire for a fat pocket book on the part of the producer.

It is an easy matter to criticise the butter maker for poor returns, but it is wise sometimes to scrutinize the tie-ups, methods of care, utensils used and sanitary conditions of the barn and milk room. Unless the individual cows in the dairy herds are steadily, if slowly, increasing in output and quality of product, breeding is a failure, and, under conditions growing more exacting yearly, the helps and hindrances all along the line call for increasing watchfulness and direct oversight. A man stood watching the test of a new binder, the bundles being opened and run over and over again until he asked how many times it might miss and be called passable. "It must bind 100 sheaves out of 100, no missing at all is permissible," was the reply. Here is the exactness of machinery and towards it the steps of every producer must be turned. That in some ways we cannot maintain this exactness in no sense relieves from the conditions which confront the toiler everywhere.

Necessity knows no compromise with filth and admits of no excuse for neglect. Competition has fixed the standard of the product and the slightest variation with a single patron injures the standing of the whole. Criticisms fall not on the great majority who observe and give sharp attention to details, but upon the few who fail to meet the requirements. If there is a single patron connected with any factory, whose tie-up is dark and close and whose habits are easy, his milk or cream is a constant menace to the entire output of that factory. No plea for the butter maker can be complete which does not lift from his shoulders the responsibilities of the cream producer.

In the steps dictated by cleanliness, the milk pail becomes an important factor and the adoption of the so-called Gurler pail, or one similar, which provides for milking through absorbent cotton, a step not to be neglected. It is in no sense a lazy, or shiftless man's utensil, but in the hands of the careful dairyman one of great value and assistance.

The study of biology opens a wonderful field for investigation and out of this there comes a better knowledge of those infinitesimal organisms, friendly and otherwise, which multiply so rapidly and make or mar the value of the product. With this there comes a better appreciation of the causes for rapid changes in milk and the increased necessity for absolute cleanliness of all utensils used by the dairyman, the thorough scalding of the same

daily and their exposure to the germ destroying sunlight, the ventilation of the tie-up, drainage of the milk room and cleanliness of the hands as well as cows at milking time. Only in maintaining uniform conditions throughout can a uniform product be possible, therefore the importance of urging seeming trifles so forcibly.

Ask your butter maker to do his duty and insist that it be done in every particular, but be sure that no obstacles are placed in his path by your own failure to attend to your duties.

Just outside the path of direct connection between the pasture or hay mow and the butter maker there enters a problem vital to the dairyman, for in proportion to his appreciation of its underlying principles rests the future of the industry. We cannot divest ourselves of that commercialism which measures the value of every industry or section by its crucial test of figures.

In the strenuous life we are living there is no opportunity for estimates or guesses and to measure with accuracy, the cost of production as well as manufacture must be more completely compassed. A great field opens before the ambitious dairy worker and the day for averages and estimates has gone.

Profitable dairy cows are not accidents but the legitimate outcome of generations of careful systematic breeding. The growth of the dairy industry may be read in the history of the dairy cows of the past fifty years. That history is cumulative and each generation contributes its quota of facts according to the energy and insight of the dairymen. Animals are responsive creatures. The objective mind of the breeder must ever dominate the subjective mind of the animal, and it is along this pathway of subjection that individuals and herds have been led, not driven, bear that in mind, led to present attainments. You can force fat on the hog but milk and butter fat come by invitation. Measure the industry from the standard of the best and a problem of startling proportions presents itself. Dairying has altogether too long been cursed by averages, for averages always reduce the volume of product and trig the wheels of progress. The average for Vermont is probably about 150 lbs. per cow. The output of the best individuals from five to six hundred pounds yearly.

He who measures his herd by total production and finds an average is boarding dead wood in his tie-up. Men must be measured as individuals. Not in concrete masses can humanity be lifted but by and through individual activity. The next step in dairy work deals with the individualism of individuals and when the cows of Vermont or Maine stand upon their individual platforms the total volume of product will be materially increased and, what is of far greater consequence, the steps

leading to the production of highest quality will be more rigidly observed. When men seek to measure individuals attention will inevitably be given to those details which increase individual production and in this attention, which seeks health, vigor and power to digest and assimilate large quantities of food, there enter in also the conditions which help the butter maker by insuring better quality of milk and cream.

Great problems confront the dairyman of this twentieth century. Type means more than breed, and individualism controls production. Functions must have opportunity for natural, easy play and by skill and clear insight the man at the head must not only invite largest production but open the door for its realization. The artist thought, which has to do with ideals, must be present with the man behind the herd as with the one who in pleasing form attracts the consumer. Unless the ideal of form, purpose and output is clear before the dairyman his every step is hampered by doubt and fettered by uncertainty. Positive men, with clear ideals and a definite purpose, reach results, and if they are the exception they surely emphasize a lesson so important that its force must be recognized and appreciated.

Gentlemen, you ask specific results from your butter makers. The reputation of the state, its position in the market, the success of the industry, the question of individual prosperity and the future of agriculture all are in the balance. Vermont, like Maine, has been, is and is to be a great dairy state. The limit has not yet been appreciated, the possibilities have not yet dawned upon the imagination of the most enthusiastic.

Intensive dairying, backed by extensive crop and stock production, suggests a development of the industry by which the millions realized from present output may be multiplied many times and that, too, without encroaching on other industries. That development must come through more completely organized brain power behind the hands that improve the pastures, grow the crops, breed, feed and care for the stock and, through the different channels, prepare for the health of every animal, the purity of the product and the finishing of the same for the palates of a public growing yearly more and more critical.

There is one supreme argument for agriculture, not applicable to any other industry, yet not kept before the public or taught the growing generations as its importance merits. Every other industry thrives by the destruction of natural forces and agents. Our forests and mountains, our mines and coal beds feed a growing multitude and bring wealth to towns, cities and states, but there must come an end to the forests, the marble and granite have limits, and the mines and coal beds are not inexhaustible; but the more thoroughly the farms are tilled, and the larger

the crops produced, the greater the possibilities and certainties of future crops. Here there is no destruction save through neglect, but wealth increasing with each harvest season. Dignify the industry and you dignify the man. It is because of these truths, known but not made prominent, that quality in men is insured through kinship with the soil. The giant forces of the Almighty so readily unlocked for the blessing of men, arouse the highest and best, stir the deeper currents of thought and in their unfolding insure that mental jar which is sure to provoke reorganization of the gray matter of the brain and furnish food for its higher development. The man who thinks is the man who grows, and thoughts come only from contact with forces outside ourselves which suggest greater possibilities.

The years but confirm the conviction that New England agriculture is waking to a great forward movement, one sure to set it in the fore front of the industrial sections of this nation. The swing of the pendulum is back towards the farms, the march of machinery is sure to reconstruct methods and practices, swell the volume of output and, rightly utilized, multiply revenue for increased blessings. The homes are fast waking to the thrill of the broader life, the standard of education gradually being modified as educational workers wake to a realization that the education of the future for the masses is to be industrial rather than classical, that a study of elementary agricultural principles teaches observation and concentration and that to help the youth of the land to observe and out of observation to know, and out of knowledge to do, is the highest service of the present age.

I should be recreant to duty if I left the impression that this spirit of commercialism, this desire to reach greatest financial results was the end and aim of this or kindred associations. We seek revenue from our labors, and urge all the steps possible by which that revenue can be increased, but God forbid that this be the purpose of our lives. Dwarf a man to this conception and he fails in the higher duties which attach to every-day work. There must be the striving for something just beyond the utilizing of what we hold within our grasp that we may reach and secure something of greater value. The man whose every thought centers in his dairy and who travels the little circle of more cows more manure, more manure more grass, more grass more cows, lives on the level of the tie-up and becomes, like the man by the loom, a machine himself, simply adding so much to the sum total of production. Such men are not builders; they live from the land, and dying, leave only stocks and bonds, the poorest legacy one can bequeath. Great men alone do great things and the measure of their greatness lies in the pictures they paint, in impressions they leave, in examples they set and the

lives they live. Only in reaching after largest possible dominion that its increased capacity may insure greater blessing can there be lasting satisfaction. Daily we are waking to the fact that the forces of the Infinite are in closer partnership than we dream and that there is no limit to human achievements save the limit of human comprehension.

The Grange has been, is and is to be the potential ally of the legally organized agricultural body of the state and, holding to its fundamental line of duty, loyal to its declaration of purposes, guided by men and women devoted to the substantial upbuilding of the state and nation, its influence will be, as it has thus far been, to mould, fashion and organize the conservative judgment of the intelligent yeomanry of the state for the accomplishment of great results through the conception of great possibilities. Out of these will come more faith in the farm, more faith in the home, more faith in this underlying, overmastering industry which while time shall last must feed the increasing army of the children of men.

For this to be possible, you and I and every worker, whether in the factory or on the farm, must prepare to stand in our allotted places, to do the best of which we are capable and seek continually for that better way which always will be just one step higher than present attainments. Goethe in his last moments cried for "more light" that he might see clearly the path of duty, Emerson would have us "hitch our wagons to a star" that there might be no limit to our striving, and Carlyle would have "the best there is in you and the whole of it" to satisfy the cravings of the aspiring soul. All through the ages these calls have been ringing out, they have stirred the ambitions and kindled the enthusiasm of men, and when, in the swing of the centuries, we wake to that essential principle of co-operation, where, shoulder to shoulder, the workers are to find each his peculiar sphere of action, the outcome of the whole will be the finished product which will satisfy. There will then be no call for a plea for the butter maker, for in line with him, side by side, keeping step to the exultant music born of positive convictions and dominating purpose, will be every worker, the sequence will be established, and from the pasture to the finished product the steps of earnest appreciative toilers may be seen working their way up the hills of difficulty into the land of positive attainment where the end shall be cultured, reliant, self-poised manhood and womanhood.

President Bruce:—From lack of time we shall have to cut off the discussion of this paper, and I now declare the thirty-fifth annual meeting of the Vermont State Dairymen's Association adjourned.

LIST OF Creameries and Cheese Factories in Vermont.

ADDISON COUNTY.

North Ferrisburg.....	Lewis Creek Creamery Co., James Field, Maker.
Vergennes.....	Vergennes Creamery, James Donahue, Maker.
Bridport	Champlain Cheese Factory, Wm. Nichols, Prop.
Orwell	Orwell Cheese Factory.
Vergennes.....	Elgin Spring Creamery, Eugene Bodette, Maker.
Ferrisburg.....	Co-op., Creamery, T. M. Cary, Maker.
Goshen.....	Otter Creek Creamery of Sudbury, Emery Parent, Maker.
New Haven.....	Beaver Glen: Cheese and Butter, Palmer Brothers, Makers.
Orwell	Clover Leaf Creamery, David Rhyan, Maker.
Lincoln.....	Lincoln Co-operative Creamery Co., Roy Montgomery, Maker.
Monkton	Donahue's Creamery, W. C. Donahue, Maker.
Middlebury.....	Middlebury Co-operative Creamery, F. M. Stearn, Maker.
New Haven.....	New Haven Co-operative Creamery, No permanent Maker.
Middlebury.....	Farmingdale Cheese Factory, F. M. Rowe, Maker.
Salisbury	Lake Dunmore Creamery, Frank B. Nelson, Maker.
Weybridge.....	Reef Bridge Creamery, Lyman Whitman, Maker.
Weybridge	Fair Valley Creamery, F. H. Jones, Maker.
Panton	Panton Co-operative Creamery, F. A. Bellows, Maker.
Shoreham	Cream Hill Creamery,
Shoreham	Shoreham Cheese Factory.
Starksboro.....	Green Mt. Cold Spring Creamery, Thomas Bruce, Maker.

BENNINGTON COUNTY.

Manchester Center.....	Manchester Factory Association, Henry Sherwin, Maker.
Winhall.....	Green Mountain Cheese Co., Henry Guilder, Maker.
Pownal	Pownal Valley Creamery, (not appointed.)
South Shaftsbury	South Shaftsbury Creamery Association, Chas. Everest, Maker.
Arlington	Hawley's Cheese Factory, G. H. Hawley, Maker.
Rupert.....	Rupert Dairy Association, Arlie Ryder, Maker.
West Rupert	West Rupert Rose Cheese Factory, Joseph Bonneville, Maker.
Landgrove.....	Mount Lake Creamery Co., M. D. Bates, Maker.
Dorset	Dorset Cheese Association, Fred G. Stone, Maker.

CALEDONIA COUNTY.

East Hardwick.....	Montgomery's Creamery, F. W. Montgomery, Prop.
McIndoes	McIndoes Falls Creamery Co., H. D. Chamberlain, Maker.
South Ryegate.....	South Ryegate Creamery, B. A. Hatt, Maker.
Lyndonville	Lyndonville Creamery Co.,
East Burke	Burke Creamery Association, Fay Warner, Maker.
Sheffield	Sheffield Co-operative Creamery Asso., S. A. Buck, Maker.
East Hardwick	Lamoille Valley Creamery Asso., W. H. Watkins, Maker.
Walden	Noyesville Creamery, F. B. Milligan, Maker.
South Walden	Walden Creamery, F. A. Messer, Maker.
St. Johnsbury.....	St. Johnsbury Creamery Co., I. J. Rolf, Maker.
Barnet	Barnet Creamery Asso., C. E. Whitehill, Maker.
South Peacham.....	South Peacham Co-operative Creamery, Frank A. Miller, Maker.

East Peacham	East Peacham Co-operative Creamery, W. J. Hastine, Maker.
Danville.....	Danville Creamery Asso., Eugene W. Hunt, Maker.
Groton	Groton Co-operative Creamery Co., H. E. Blaisdell, Maker.
Ryegate.....	Jersey Hill Creamery Co., E. E. Symes, Maker.
East Ryegate	East Ryegate Creamery Co., Johnson, Maker.
North Ryegate	Blue Mountain Creamery, Chester Somers, Maker.

CHITTENDEN COUNTY.

Colchester	Colchester Co-operative Creamery, H. W. Blondin, Maker.
Charlotte.....	Mount View Corporation, William Day, Maker.
Charlotte	Crystal Creamery, Emmons Dart, Maker.
Charlotte.....	Lake View Creamery, W. V. Beach, Maker.
Essex	Brown's River Creamery, M. B. Leach, Maker.
Jericho.....	Beaver Brook Farm Creamery, J. A. Leary, Maker.
Milton.....	West Milton Butter Factory, John Ellis, Maker.
Milton.....	Milton Bow Cheese Factory, Thomas Shean, Maker.
Milton	Milton Creamery, J. E. Donahue, Maker.
Underhill Center	Goes to Cloverdale Creamery Co.
Underhill	The Co-operative Creamery.
Richmond.....	Jonesville Creamery Asso., (P. O. Jonesville.) C. C. Fuller, Maker.
Hinesburgh	Valley Falls Creamery, Henry Brothers, Maker.
Westford	Cloverdale Creamery Co.
Westford	Union Cheese Co.
Williston	Co-operative Creamery, H. O. Whitney, Maker.
North Williston	Winooski Valley Co-operative, Asher Hall, Maker.

Hinesburgh	The Chittenden County Creamery, Dave Donahue, Maker.
Essex Junction.....	Lake Champlain Creamery, J. W. French, Maker.
Essex Junction	Donahue Creamery, M. F. Donahue, Maker.
Huntington.....	Norton & Johnson Creamery, T. W. Johnson, Maker.
Huntington Center.....	G. M. Norton & Co. Creamery, H. J. Ellis, Maker.
Jericho	Queen City Creamery, W. G. Newton, Maker.
Shelburne	Shelburne Creamery.
Milton	Milton Creamery Co., H. A. Allen, Maker.
West Milton	West Milton Creamery, Tom Donahue, Maker.

ESSEX COUNTY.

Concord	Trout Brook Creamery Co., M. B. Carpenter, Maker.
Victory	Moose River Creamery, Carl Phelps, Maker.
Lunenburg	Lunenburg Creamery, W. H. Colby, Maker.

FRANKLIN COUNTY.

St. Albans	Franklin County Creamery.
Highgate	J. H. White & Sons Creamery, Boston, Mass. Heman Merritt, Maker.
Richford	Franklin County Creamery Asso.
Franklin.....	Franklin County Creamery Asso.
Sheldon	The Francis Batchelder Co., Boston, Mass. W. S. Lackie, Maker.
Fletcher	Clover Leaf Creamery, F. L. Smith, Maker.
Berkshire Center....	Franklin Co. Creamery Asso., (St. Albans)
East Berkshire	Marcey's Creamery, H. Nutivin, Maker.
West Berkshire	Vermont Clover Creamery, Mark Hicks, Maker.

Georgia	The Gem Creamery (J. H. White & Son, Boston)
Georgia	Green Mountain Cheese Factory, O. B. Wood, Proprietor.
Fairfax	Fairfax Co-operative Creamery, W. W. Holbrook, Maker.
Enosburgh	Enosburgh Falls Creamery Co., W. V. Phelps & O. D. Samson, Owners.
Montgomery	Crystal Falls Creamery, G. W. Rowse, Maker.
Richford	Dudley Bros. Creamery, Dean Dudley, Maker.

GRAND ISLE COUNTY.

South Hero	South Hero Creamery Asso., D. M. Robinson, Maker.
Alburgh	W. R. Boynton & Co., Owners.
Grand Isle	Sampson's Creamery, U. A. Gage, Maker.
Grand Isle	Grand Isle Co., H. W. Gage, Maker.
North Hero	North Hero Co-operative Creamery, F. E. Rice, Maker.

LAMOILLE COUNTY.

Cambridge	The Cambridge Creamery, E. H. Hinds, Maker.
Elmore	Lake Elmore Creamery Co., Van R. Chase, Maker.
Johnson	Gion Valley Creamery, W. H. Stearns, Maker.
Morrisville	Jersey Heights Creamery, E. C. Johnson, Maker.
Wolcott	Riverside Creamery, Fred Jackson, Maker.
Stowe	Mt. Mansfield Creamery, A. E. Douglass, Maker.

ORANGE COUNTY.

Brookfield	C. Brigham & Co. Creamery, William Haggett, Maker.
Corinth	Riverside Creamery Co., Fred W. Ellis, Maker.

East Corinth.....	East Corinth Creamery Co., Geo. Hayward, Maker.
Bradford	Bradford Creamery Co., F. H. Bickford, Maker.
Newbury	Newbury Village Creamery, George Doe, Maker.
North Randolph	Brigham Company Creamery, Geo. H. Temple, Maker.
Randolph	Randolph Co-operative Creamery, F. R. Whitejaw, Maker.
Fairlee	H. P. Hood & Sons, L. S. Butman, Maker.
West Fairlee.....	Lyndonville Creamery Co., Fred Kibby, Maker, (South Fairlee)
Tunbridge.....	Tunbridge Co-operative Creamery, George Sumner, Maker.
Thetford	North Thetford Creamery, John Campbell, Maker.
East Thetford.....	Hood's Creamery, Ernest Lyndon, Maker.
Strafford	Strafford Creamery, William Stone, Maker.
Washington	Washington Creamery, Leo W. Seaver, Maker.
Williamstown	Lyndonville Creamery Asso., Fred McPhee, Maker.
North Randolph.....	North Randolph Co-operative Creamery, F. W. Wells, Maker.
Bradford	Hillside Creamery, W. H. Coburn, Maker.
Chelsea.....	Orange County Creamery, E. D. Fuller, Maker.
Randolph	Brigham Creamery, J. J. Stimetts, Maker.
Topsham	Topsham Creamery, F. R. Hayward, Maker.
Vershire	Vershire Creamery, J. M. Goodwin, Maker.
Wells River.....	Wells River Creamery Co., H. L. Lyster, Maker.
West Topsham	Green Mountain Creamery, J. F. McLamm, Maker.

ORLEANS COUNTY.

Craftsbury	Mill Village Creamery, Wm. Ryan, Maker.
Craftsbury	Black River Creamery, Bishop Bro's., Proprietors.
Coventry	Black River Creamery, H. B. Bailey, Maker.
Barton	Crystal Lake Creamery, Jerry Buckley, Maker.
Barton Landing	J. G. Trumbull & Co. Creamery, W. B. Leonard, Maker.
Derby.....	Highland Co-operative Creamery, James McCaffery, Maker.
East Charleston.....	Clyde River Creamery, George Greenwood, Maker.
West Charleston	J. G. Trumbull Creamery, Charles Counter, Maker.
Albany.....	The Albany Creamery, D. H. Hackett, Maker.
Greensboro.....	Caspian Lake Creamery, E. K. Hill, Maker.
Glover	Lyndonville Creamery Asso., David Wilson, Maker.
Lowell	J. G. Trumbull Creamery, E. S. Cooledge, Maker.
Newport Center.....	J. G. Trumbull Co., F. A. M. Estelle, Maker.
North Troy	Orleans County Creamery, C. H. Comstock, Maker.
South Troy	Troy Creamery.
West Glover	Meadow Brook Creamery, N. C. Stevens, Maker.

RUTLAND COUNTY.

Hortonville	Lake Horton Creamery.
West Pawlet	Vermont Valley Creamery.
Ira	River Side Cheese Co., W. W. Jenks, Maker.
Middletown Springs.....	Hudson Valley Creamery, C. C. Graves, Maker.
Middletown Springs.....	Spring Valley Cheese Factory, Erwin Leonard, Maker.

Tinmouth	C. Brigham & Co. Creamery, Clarence Wilbur, Maker.
Tinmouth	Bull Brothers Creamery, William Hill, Maker.
Wells	Lewisville Cheese Factory, C. E. Lewis, Maker.
East Wells.....	East Wells Cheese Factory.
Benson	Benson Creamery, C. C. Perry, Maker.
Benson	Maplehurst Creamery, Charles Goss, Maker.
Wallingford	C. Brigham & Co. Creamery, A. W. Andrews, Manager.
Castleton	Capital Creamery, A. J. Baker, Maker.
West Rutland	Smith Town Cheese Factory, Fred Hawkins, Maker.
Pawlet	Clover Vale Creamery, Roy N. Clayton, Maker.
Proctor	Proctor Creamery, S. L. Harris, Maker.
Poultney	Hudson Valley Creamery Co., Walter Greer, Maker.
East Poultney	East Poultney Cheese Man'g Co., Bert Tanner, Maker.
Fair Haven.....	Champlain Valley Creamery, Chas. Traux, Maker.
Pittsford.....	Rutland County Creamery, Fred Jacobs, Maker.
Mechanicsville.....	Boston Dairy Co., W. E. Aldridge, Maker.
Shrewsbury	Gleason's Cheese Factory.

WASHINGTON COUNTY.

Waitsfield	Waitsfield Creamery Co., Will Parsons, Maker.
Waitsfield.....	Mad River Valley Creamery, O. Baker, Maker.
East Montpelier.....	East Montpelier Creamery Co., John Bond, Maker.
North Montpelier.....	North Montpelier Creamery Co., E. C. Hills, Maker.
Middlesex.....	Shady Rill Creamery, Montpelier, Harold Austin, Maker. (P. O. Montpelier.)

Middlesex.....	Middlesex Creamery, M. W. Reynolds, Maker.
Northfield	Clover Dale Creamery, E. E. Derby, Maker.
Warren	Warren Co-operative Creamery, W. E. Jackson, Maker.
West Berlin	Arthur E. Bryant's Creamery, A. E. Bryant, Maker.
Moretown	Cold Springs Farms Creamery, F. H. Sawyer, Maker.
Barre City.....	L. B. Dodge Creamery, C. A. Smith, Maker.
Cabot	Cabot Creamery Co., Howard Carpenter, Maker.
Marshfield	Marshfield Co-operative Creamery Asso., Chas. Lilley, Maker.
Roxbury	Summit Creamery Co., J. W. Howe, Maker.
Plainfield	Plainfield Co-operative Creamery, Fred Cree, Maker.
Barre	Cobble Hill Creamery, F. W. Montgomery, Maker.
Calais	Calais Creamery, Guy Bancroft, Maker.
Waterbury Center.....	Waterbury Creamery.
Waterbury	Winooski Valley Creamery.
Waterbury	F. Batchelder & Co.
Northfield	Northfield Creamery.
Montpelier	Montpelier Creamery Co.

WINDHAM COUNTY.

Westminster	Valley Creamery, J. W. Vassar, Maker.
Londonderry	West River Cheese Co., W. L. Gibson, Maker.
South Londonderry.....	Mount Lake Creamery Co., C. D. Boynton, Maker.
Newfane.....	Windham Creamery Co., W. B. Millard, Maker.
Erattleboro	Brattleboro Creamery, Merton R. Micott, Maker.
Wilmington	Deerfield Valley Creamery Asso., Henry Allen, Maker.

Putney	Putney Creamery Association, H. P. Cushman, Maker.
Dummerston	Brattleboro Creamery.
Guilford	Brattleboro Creamery.
Vernon	Northfield Creamery, At Northfield, Mass.

WINDSOR COUNTY.

Reading	Reading Cheese Factory Asso., Ira Gibbs, Maker.
Weston	Weston Cheese Asso., George Woodbury, Maker.
Sharon	Sharon Co-operative Creamery Asso., Hiram C. Bruce, Maker.
Andover	Andover Dairy Asso.
Simonsville	Simonsville Cheese Factory, C. S. Leonard, Maker.
Royalton	Waldo Creamery, Leon Richardson, Maker and Owner.
Royalton	S. & F. Creamery, Fred Fowles, Maker.
Rochester	Rochester Creamery, A. L. Lewis, Manager.
Bethel	Bethel Lympus Co-operative Asso., W. L. Fish, Maker.
Springfield	Springfield Creamery, Chas. Hastings, Maker.
Windsor	Hillside Creamery in New Hampshire, Harry Sedgell, Manager, Windsor.
East Barnard	Harley Howe, East Barnard.
Cavendish	Fletcher Dairymen's Asso., David Nelson, Maker.
Plymouth Union.....	Plymouth Cheese Factory, E. C. Aldrich, Maker.
Norwich	Hood Brothers, C. P. Brown, Maker.
West Bridgewater.....	West Bridgewater Cheese Factory, John Aldrich, Maker.
Woodstock	Woodstock Creamery, C. F. Eddy, Owner.
North Pomfret.....	Sherburne Creamery, J. C. Sherburne, Owner.
West Hartford	Howard's Creamery, E. S. Howard, Butter Maker.

West Hartford.....	West Hartford Creamery, Frank Morse, Butter Maker.
Woodstock	Hood's Creamery.
Hartland	Hartland Creamery, Hartland 4-Corners.
Hartland	Brookside Creamery, F. J. Chase, Butter Maker, Hartland 4-Corners.
Pomfret	Cloudland Creamery, F. B. Dutton, Mgr., P. O., Woodstock.
Silver Lake Creamery	Barnard, Vt.

Licensed Operators of the Babcock Test.

The following list shows the names, addresses and license numbers of parties who have been licensed between March 10, 1904, and March 10, 1905, in accordance with Section 2 of No. 81 of the Acts of 1898. The names, addresses and number of parties licensed prior to March 10, 1904, will be found in the twenty-ninth, thirtieth, thirty-first, thirty-second, thirty-third and thirty-fourth reports of this Association.

SECTION 2. Each and every person who, either for himself or in the employ of any other person, firm or corporation, manipulates the Babcock test, or any other test, whether mechanical or chemical, for the purpose of measuring the contents of the butter fat in milk or cream as a basis for apportioning the value of milk or cream, or the butter or cheese made from the same, shall secure a certificate from the superintendent of the dairy school of the University of Vermont and State Agricultural College that he or she is competent and well qualified to perform such work. The rules and regulations in the application for such certificate shall in no case exceed one dollar, the same to be paid by the applicant to the superintendent of the dairy school and be used by the superintendent in meeting the expenses incurred under this section.

Name.	Postoffice.	License.
H. R. Merritt	Highgate Center	No. 483
A. S. Clapp	Woodstock	484
C. O. Osha	Randolph	485
B. J. Eno	Charlotte	486
E. A. Dodge.....	Barre	487
Edward Nichols	Bridport	488
A. B. Hall	No. Williston	489
C. C. Mears	No. Montpelier	490
C. M. Lilley.....	No. Montpelier	491
H. H. Carpenter	Cabot	492
W. J. Orr	McIndoes Falls	493
G. W. Rowse, Jr.....	Montgomery	494
E. S. Cooledge	Lowell	495
A. F. Walker	Castleton	496

SECOND
ANNUAL REPORT
OF THE
Vermont State Horticultural Society.

PROCEEDINGS
OF THE
TENTH* ANNUAL MEETING,
HELD AT VERGENNES,

FEB. 9 AND 10,
1905.

*Through a misunderstanding of the date on which the Society was organized this meeting was advertised as the eighth annual meeting instead of the tenth. Owing to lack of funds only one previous report, that of the first meeting, has been published.

W. STUART, Sec'y.

LETTER OF TRANSMITTAL.

To His Excellency C. J. Bell, Governor of Vermont;

Déar Sir.—In accordance with the requirements of law, I have the honor to transmit to you the Second Annual Report of the Vermont State Horticultural Society.

Respectfully,

WILLIAM STUART,

Secretary.

OFFICERS
OF THE
VERMONT STATE HORTICULTURAL SOCIETY.

PRESIDENT.

E. S. BRIGHAMSt. Albans, Vt.

COUNTY VICE-PRESIDENTS.

Addison.....F. E. FOOTE
Bennington.....C. A. HINSDILL.
Caledonia.....C. J. BELL.
Chittenden.....C. E. BROWN.
Franklin.....H. K. BROOKS.
Grand Isle.....A. H. HILL.
Lamoille.....GEO. H. TERRILL.
Orange.....DANA MORSE
Orleans.....W. E. ROBINSON.
Rutland.....D. C. HICKS.
Washington.....S. S. BALLARD.
Windham.....A. A. HALLADAY.
Windsor.....GEO. W. PERRY.

SECRETARY.

WM. STUART.....Burlington, Vt.

TREASURER.

A. M. VAUGHANRandolph, Vt.

AUDITOR.

T. L. KINNEY.....So. Hero, Vt.

CONSTITUTION
OF THE
VERMONT STATE HORTICULTURAL SOCIETY.

ARTICLE I.

Name—This Society shall be known as the Vermont State Horticultural Society.

ARTICLE II.

Object of the Society—The object of this Society shall be for the purpose of improving the condition of pomology and other branches of horticulture, and disseminating correct information concerning the culture of such fruits, flowers, trees, and other productions in horticulture as are adapted to the soil and climate of Vermont.

ARTICLE III.

Membership—Any person may become a member by paying the secretary or treasurer an annual fee of fifty cents, or a life member upon the payment of five dollars.

Honorary members for a time stated or for life may be elected at any annual meeting by a two-thirds vote of the members present.

ARTICLE IV.

Officers—The officers of the Society shall consist of a president and one vice-president from each county of the State, a secretary and treasurer, an auditor, and an executive committee composed of the officers of the Society.

ARTICLE V.

Duties of the president and vice-presidents—It shall be the duty of the president to preside at and conduct all meetings of the Society, and deliver an annual address. In the absence of the president this duty shall devolve upon the vice-presidents in their order. It shall be the duty of the vice-presidents to assume general supervision of the horticultural interests of their county, and shall make written report of the same to the Society at its annual winter meeting.

ARTICLE VI.

Duties of the secretary—The secretary shall record all the proceedings of the Society, collect and prepare all communications for the public press, and pay over all moneys received from members or otherwise to the treasurer on his receipt; receive and answer all communications addressed to the secretary, and as an executive officer, aid the president in the dispatch of business relating to the meetings of the Society.

ARTICLE VII.

Duties of the treasurer—The treasurer shall collect and hold all funds of the Society and pay out the same only on the order of the president, countersigned by the secretary. He shall make up a report of all the receipts and disbursements of the Society and present the same at the annual winter meeting or at any other time when called upon to do so by the executive committee. He shall give bonds in such sum as the Society may direct, to be approved by the president and secretary, and the bond when so approved shall be filed with the State Auditor.

ARTICLE VIII.

It shall be the duty of the auditor to examine the books of the treasurer and report same to the State Treasurer.

ARTICLE IX.

Election of officers—The officers of the Society shall be elected annually by separate ballot and shall hold their offices until their successors are elected.

ARTICLE X.

Meetings of the Society—The Society shall hold their annual sessions at such time and place as seems best to the executive committee.

ARTICLE XI.

Amendments—By-laws and alterations of the constitution may be enacted by a vote of two-thirds of the members present at any regular annual meeting, one day's notice of the same being given.

RECENT STATE AID.

Among the public acts passed by the 1904 General Assembly of the State of Vermont was one entitled, "An act to promote the Horticultural interests of Vermont," which is as follows:—

No. 15.

AN ACT TO PROMOTE THE HORTICULTURAL INTERESTS OF VERMONT

It is hereby enacted by the General Assembly of the State of Vermont:

Section 1. The sum of five hundred dollars (\$500.00) is hereby appropriated annually to the Vermont State Horticultural Society for the purpose of promoting, encouraging and developing the horticultural interests of the State.

Sec. 2. The auditor of accounts is hereby directed to draw an order on the state treasurer in favor of the treasurer of the Vermont State Horticultural Society for the first payment of this appropriation on the second day of January, 1905, and annually thereafter so long as the conditions hereinafter provided shall be complied with.

Sec. 3. Said Vermont State Horticultural Society shall hold an annual meeting, of at least two days' duration, at some town or city in the State which is easy of access to the people and in some convenient and suitable building. At said meeting men of horticultural note shall be engaged to teach and discuss the best methods of fruit, vegetable and flower culture, as well as the handling and marketing of the product. At the said annual meeting premiums not to exceed one hundred dollars shall be offered for the best exhibits of fruits, vegetables, and flowers, said premiums to be awarded by disinterested and expert judges, and paid by the treasurer of the Vermont State Horticultural Society.

Sec. 4. The secretary of the Vermont State Horticultural Society shall on or before December 1, 1905, and annually thereafter, make a detailed and itemized account to the state auditor of accounts of the receipts and expenses of said society which accounts shall be approved and countersigned by the treasurer and auditor of said society.

Sec. 5. If in any year it shall appear to the state auditor of accounts that any part of the preceding annual appropriation has been injudiciously expended, then such part or amount may be deducted from the order for the ensuing annual appropriation.

Sec. 6. The report of the annual meeting of the Vermont State Horticultural Society shall be published by the State Board of Agriculture in their annual report as provided in section two hundred forty-seven of Vermont Statutes.

Sec. 7. This act shall take effect from its passage.

Approved December 9, 1904.

This act will enable the Society to provide more interesting meetings, by securing the best speakers available, and also insure the publication of its proceedings, thereby disseminating the knowledge brought together at these gatherings.

LIST OF MEMBERS

OF THE

VERMONT STATE HORTICULTURAL SOCIETY.

Aitken, George	Woodstock
Brownell, C. W.	Burlington
Brigham, E. S.	St. Albans
Bristol, R. H.	Vergennes
Bristol, E. S.	Vergennes
Craig, Wm.	Abbotsford, P. of Que.
Fisk, N. W.	Fisk
Foote, F. E.	Middlebury
Fay, P. J.	Shelburne Farms
Gage, L. Merlon	Bristol
Gordon, Edwin	Grand Isle
Hicks, D. C.	No. Clarendon
Horsford, F. H.	Charlotte
Halladay, A. A.	Bellows Falls
Hitchcock, E.	Pittsford
Hemenway, R. L.	Bridport
Hunt, E. G.	New Haven
Hewitt, Homer H.	Bristol
Johnson, C. H.	Burlington
Jones, L. R.	Burlington
Jacobs, H. B.	Vergennes
Kinney, T. L.	So. Hero
Kimball, G. F. O.	Vergennes
LePage, Mrs. Chas.	Barre
Munson, Prof. W. M.	Orono, Me.
Miller, J. A.	East Dummerston
Miller, Arthur L.	East Dummerston
Miller, F. H.	Halifax

Morse, D. H.	Randolph
Perry, Geo. W.	Chester Depot
Putnam, Luther	Cambridge
Richards, W. N.	Vergennes
Robinson, Mrs. R. E.	Ferrisburgh
Sheldon, L. H.	Fairhaven
Stuart, W.	Burlington
Smith, C. F.	Morrisville
Smith, S. W.	Addison
Small, F. M.	Morrisville
Stevens, John McLean	Orwell
Sumner, Chas. D.	Middlebury
Terrill, Geo. H.	Morrisville
Thomas, J. C.	Vergennes
Thomas, G. F.	Addison, R. F. D.
Vaughan, A. M.	Randolph
Warner, C. F. & Co.	Ticonderoga, N. Y.
Waugh, Prof. F. A.	Amherst, Mass.
Weeks, W. F.	Shelburne
Whitney, S. B.	Enosburgh Falls
Whitford, L. G.	Vergennes
Wood, Dr. H. W.	St. Johns, P. of Que.

ADDRESS OF WELCOME.

DR. PHELPS, MAYOR OF VERGENNES.

*Mr. President, Members of the Vermont Horticultural Society,
Ladies and Gentlemen:*

I notice by this program handed me that you expect an address of welcome this afternoon from me. I am very sorry to disappoint you, for two years ago when the people of Vergennes elected their Mayor they were unfortunate in not securing a public speaker. However, we are very much pleased to have the annual meeting of the Vermont Horticultural Society held in Vergennes, situated as we are in the Champlain Valley, one of the most fertile and productive sections in the State of Vermont. While we have not very much of interest to show you at this time of the year, if you will visit us in the summer we will show you some of the most beautiful farms, some of the largest and most productive orchards, and the ladies can show you beautiful flower beds and some of the finest gardens in Vermont.

We are very glad to welcome you to Vergennes and hope you will go away carrying with you not only many points of interest

and help from this meeting, but also many happy memories of the place, and return in warm weather to visit us again.

Response by the President:

We are very glad, as the Horticultural Society of Vermont, to bring you, the people of Vergennes, our greeting on this occasion. This is one of the agricultural interests of the State. As you all know the interests of the State are varied, but this is one of its agricultural interests and, I believe, one of the leading industries. In fact, take it throughout our country it is second in importance to no other industry.

We have not in the years that have passed received from the State of Vermont the encouragement that we should, but this year we have received an appropriation from the State which I hope will enable us to do more and better work in this regard.

You all know that it takes money to run any kind of business, and this Society, while it has been struggling for nine years with little capital, has, by persistent efforts, kept its wheels rolling until the present time. Now we have this small appropriation and we look for an increase in the interests and development of our work. I believe that the motto of the horticulturists of this State should be, to produce a fruit superior to any that is produced in the land. We certainly have the conditions, the soil, the climate, and our motto should be,—nothing but the best.

I will now close by extending to the people of Vergennes our most hearty greeting with the hope that we shall so conduct ourselves while here, that some time in the future we shall not be ashamed to ask an opportunity to come here again for this meeting, as this is one of, yes, the leading county in the State of Vermont in apple growing.

REPORT OF SECRETARY-TREASURER.

RECEIPTS.

1904

Feb. 19, To balance on hand.....	\$ 5 00
To membership dues	14 50

1905

Feb. 6, Received from Auditor of State.....	500 00
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Total Receipts

\$519 50

EXPENDITURES.

1904

Jan. 27, College Glee and Mandolin Clubs....	\$ 10 00
Aug. 4, Postage	1 20
Aug. 4, Miss Chase for stenographic services ..	75
Aug. 11, Postage	28
Oct. 4, Free Press Association for printing....	3 50
Nov. 23, Miss Chase for stenographic services	80
Nov. 23, Postage	97
Dec. 22, Free Press Association for printing..	2 00

1905

Jan. 3, Postage	97
Jan. 3, W. Stuart, expenses to Vergennes and return	1 20
Jan. 10, W. Stuart, express charges	25
Jan. 26, Postage	6 20
Feb. 2, Postage	1 00
Feb. 3, F. L. Lane & Co., printing.....	2 75
Feb. 4, W. Stuart, expenses to Vergennes and return	1 20
Feb. 8, Telephone bill	1 28
Feb. 8, Treasurer's book	40

Total	\$34 75
Total receipts	\$519 50
Total expenditures	34 75
Balance on hand Feb. 9, 1905....	\$484 75

Respectfully submitted,

W. STUART,
Secretary-Treasurer.

"SUGGESTIONS FOR PLANTING AND CARING FOR THE YOUNG ORCHARD."

A. M. VAUGHAN, RANDOLPH, VT.

Mr. President, Ladies and Gentlemen:

What I have to say to you will come in line with my own experience in planting and caring for the young orchard. For the past four years I have been where I have had charge of the planting of something like 8,000 trees, both apple, pear and plum, and it is to these three kinds of young trees that I refer in any suggestions I may make with reference to planting and care,

In the first place, I would not advise any one who is going to plant an orchard to do so without preparation, the same, or nearly the same, as for almost any other crop. It may not need so fine a preparation as for seeding down for grass, but it certainly does need plowing and harrowing to subdue the grass and weeds to some extent, especially the grass which is a serious drawback to the growth of any tree.

This done, the next step is to lay out the orchard, having determined first the distance apart you want your trees. This, of course, depends upon the individual taste of the owner of the orchard. I have set them 33 feet apart in direct lines each way; this takes 40 trees to the acre. To do this, I measured around the field on the four sides, the field is nearly rectangular in form, and set a stake back next to the fence or wall back of the end of each row, thus marking it in both directions, north and south, east and west; then set a center stake in each row in each direction. You can readily see that by standing where you can sight the lines of stakes at right angles, you are standing where a tree will stand.

Then the holes are to be dug for the trees, and my experience is that the cheapest and best way is to employ a stout pair of horses, a sidehill plough, and a good driver who will drive exactly in this line, and of course he will rip up the center stake. It takes about three trips with a plough to turn out a good deep furrow and loosen up the subsoil to some extent. Then the middle stake in each row is to be re-sighted and re-set.

Now, you are ready to get at the planting. Right here it may be a good plan to speak of the care of the trees previous to the planting.

We hear a great many times that the nurseryman sent poor stock; the trees didn't arrive in good condition, and almost always the fault is laid to the nurseryman. I never saw any trees received from the hands of a nurseryman that were not in good condition. The fault is very apt to be at your door. You didn't take care of the trees after you received them, between that time and the time you planted them. It is absolutely necessary to keep them from currents of air, and to keep them moist and away from the air, and that means the sunshine, especially. If you do this, the chances will be very much more in favor of success.

The trees should be parceled out, the number that is required for each row; these should be placed at the end of each row and the roots lightly covered, then they can be pruned and dropped nearly where they are to be planted. The roots of the trees should be pruned only so far as they are bruised and appear to be long enough to be in the way. I don't care for the roots to be any longer than 6 or 8 inches; but if any are mutilated they

should be pruned, so when the tree sets down in the soil the cut surface comes against the soil.

Then with the tree in position, the planting gang starts in, consisting of a planter and two shovelers. The planter takes the tree in his hand and sets it in the hole, one shovel on either side; the planter holds the tree while the shovelers place the dirt on either side and around the roots; first three or four shovels full of soil should be removed from the bottom to loosen the soil, then when this is replaced on the roots it is in a fine condition. After the tree is set in position they fill up the hole as quickly as they can shovel the soil. And right here comes in the need of previous preparation for planting the orchard, for then they can get good soil to fill into the hole without hunting for it. As fast as they shovel the earth in they should tramp it well around the tree; that is another point between the success and failure.

Plant the tree a very little deeper than it grew in the nursery; not more than an inch above the collar, the top of where the soil came when it grew in the nursery. This done, make a trip around the row with a plough to turn back the dead furrow. It can be filled up in this way very satisfactorily.

If the planting is done in the fall, mound up around the tree to drain the water; if the planting is done in the spring, leave it shallow, so it will catch the rain, but it is important to mound the earth up a little in the fall to turn the water, because water collecting and then freezing is pretty apt to injure the young tree.

As regards spring or fall planting; either one is all right. I have done most of my planting in the fall, and the results are equally good, whether I plant in Vermont or Maryland, having lost only on an average of one per cent.

In the fall the season for planting is longer commencing as soon as the trees shed their leaves and lasting until the ground is frozen. And it is very apt to be the case that you can attend to the matter at that season of the year better than you can in the spring, because when spring opens everything is rushing, and you are apt to be hindered with the planting too long. But if you cannot plant in the fall, plant in the spring. It may require a little different treatment and take a little more time in the spring. In the fall all you have to do is to follow along the lines I have spoken of, but in the spring, if it is warm and dry you have to take a little more precaution; you can do this in two ways. Of course you can water, but we want to avoid that if possible. Yet if it is too dry it has to be done. Then there is "puddling." Dig a hole in the ground and in it mix a shovelful of clay and some water—in this part of the country

clay, will stick—hence clay and water will stick to the roots of a tree the same as to your boots. This will protect the roots and keep them away from the air, and will furnish a little moisture to start the tree off. If a little later in the season the leaves haven't started I think it is good to give them two or three quarts of water; that quantity is as good as much more, and does not cause the soil to dry and crack, as much as more water would do.

If the leaves have started in the spring, it is very important to strip them off, before the planting is done, because if the tree is planted with the leaves on, they will draw the moisture right out of the root, and the root has no chance to take moisture in; this is very important. Trees planted in the fall require no pruning; in fact they should not be pruned.

There are several theories in regard to pruning; some think it is too bad to cut them all to pieces; but it is the best thing that can happen to a tree to be cut to pieces considerably at that time. Take the young tree, you only see what roots there are on it when it comes to you; you haven't more than one-tenth of the roots that belong to the tree. The roots of a tree will extend in the soil certainly as far as the tree stands in the air, laterally, not right straight down. So you can see when we have trees from the nursery with roots 6 to 7 inches long, how much has been sacrificed in taking them up. You can see what happens if you leave the top on. You should cut off nine-tenths of the top. Then what vigor the tree has in the root is thrown entirely into the few buds left, and it will make a good growth.

You can certainly get the best results by pruning all the trees alike; and practically all the way you can prune them alike is to cut the top all off, and in my experience this has given the best result. Some people would say leave two or three buds on each branch, but my experience has been that it is best to cut the top off clean, leaving a straight cane. The cane will throw out plenty of branches, and it will be a very short time before you will have to rub them off, and you can then throw the growth where you want it. The most beautiful orchard I have ever seen consisting of some 14,000 trees was handled in just this way; they looked alike; all made a beautiful growth. So much for the pruning at the time of the planting.

The pruning which follows in the succeeding years depends upon the shape in which you wish to grow the tree, whether open to let in the sunlight, or compact. Now, there are reasons for growing trees in both ways. Permanent trees which you want to grow for 40 or 50 years, should certainly spread to let the sunshine in. The "vase" form of pruning is, after you cut your tree back to a cane, you can then allow three or four

branches to come at a distance of 6 or 12 inches apart; then you have no leader in the tree; the tree is straight up to begin with. That is the start of the vase form of pruning. After the tree has made one year of growth, three or four of the best branches should be left, all the rest cut away. The second year, two branches can be left on each of these main branches, and all the rest cut away, and this can be carried on for three or four years. Then you have your main framework of the tree. Then you can leave some branches for fruiting, not even cut off the ends, unless you want to; but it isn't wise with a pear tree to leave any branches on next the main branches which will form your framework, because some varieties of pears are apt to throw out fruit spurs on the main branches, and if you are afflicted with pear blight this gives a chance for that to get started on the trunk. Of course this method cannot be kept up indefinitely. There comes a time when you will have too many branches and then you must do as you see fit.

After the pruning of the tree in the spring the next thing is cultivation, which is just as necessary to the growth of the young tree as to the hill of corn. The cultivation is for the same result; the preservation of the moisture and liberating the fertility of the soil. This should be continued throughout the summer, until about the first of July, or into July; it encourages growth all the time it is continued, and without growth you cannot have the new wood and the buds; but if it is continued longer than that, the wood which is grown is apt to be immature, and stands a great chance to winterkill. It is advisable not to cultivate longer than the time named.

In regard to fertilizing.

I have fertilized indirectly; I have raised short crops between the rows of trees, plants not growing high, like potatoes, tomatoes, cabbage, etc., which require a good liberal fertilizer, and the trees draw on this indirectly. This is all the fertilizing I have ever practiced, but I should not discourage anybody in the use of direct fertilizer on the trees, if they saw fit, and I should do it myself if I didn't fertilize them indirectly, by crops.

As far as spraying the young orchard is concerned, I don't think it is necessary to prevent disease, if good cultivation is given. If injurious insects get on the trees you will have to spray with some poison, but as far as blight and diseases which affect the fruit go, I don't think it is necessary to spray for these. Cultivation will keep the trees growing, and accomplish the desired results.

"SOME POINTERS ON GROWING AND MARKETING FRUIT."

T. L. KINNEY, SO. HERO, VT.

Mr. President, Ladies and Gentlemen:—

It gives me the greatest pleasure to come to this horticultural convention—the tenth on our list, and to see such enthusiasm, such earnestness, and such a grand exhibit of fruits and flowers, the progress all along the line. It makes me think that it is an advantage to have a dollar behind anything that is worthy carrying on; and while we have been struggling for so many years without very much financial aid—only as we have contributed ourselves—now we have a few hundred dollars behind us to back us up along the lines of horticulture, and it has given us a great stimulus: and not only the dollar, the Almighty Dollar, but these dollars were appropriated by the State of Vermont, by the Legislature of our State, and at a time when the Legislature was loath to make an appropriation for anything, no matter whether it was good or bad, but our cause did receive their attention, and almost a unanimous vote from the members of the House and the Senate for the appropriation; and our Governor was interested too. I don't believe there was anything that he signed with more good will and feeling than he did the bill for this appropriation to aid the horticulturists of our State. So you see, it is not only the dollar, but the feeling that exists between the producers of the State of Vermont and the consumers, and those people who represented us at Montpelier, who represented the people of the State, the principle, the theory, the thought, the feeling that they had for this great enterprise, that back us up and give us more energy. We are glad of this gift; we are glad, indeed, that the money fell into such good hands as those of Professor Stuart, who is using it with such wonderfully good results, a grand program and a grand exhibit of fruit, and a good turn-out and a good interest. When our society has met, many times in the different places, we have come together for the first session with hardly a person to listen to the speeches which were to be presented to them, but this time we have a good attendance at the very start.

The subject which has been given me is "Some Pointers on Growing and Marketing Fruit." I am heartily glad that one of our Vermonsters has given you such a grand talk along the lines of starting the fruit and caring for it, starting the orchard. I was in hopes Mr. Willard could have been here to give us some points on "The Apple" before I had anything to say upon the subject given me.

I shall not dwell very long upon the subject of growing the fruit, and shall make my remarks as far as I can along the line of production of apples, because the rules that apply to apple production will apply to most any other fruit that we grow in Vermont, and having more practical experience in apple production, I feel more at home along that line.

I want to say there are many things to encourage the farmers of Vermont to grow apples, more than the dollars that come from the sale of the apples or other fruit, the attraction to the home, beautifying Vermont, its already beautiful scenery, landscape gardening. We have some very fine landscape gardening; of course the orchards were bare once; the trees were put there, the work of man; somebody must have worked out these plans to get the subjects from which these pictures were taken that adorn the walls of this hall. We must make Vermont more attractive so that the city people with the money and leisure may come and enjoy themselves in our various localities, some on the lakes, some in the mountains, and all over. If we can beautify our farms, the landscape, by nice orchards, nice straight rows of apple trees, apple trees that are round in shape, nicely formed, trim them up so they will be fine in appearance, so the sun will reach the tips of the limbs and the center of the tree, so the mildew cannot touch the fruit; all this gives profit to the farmer, and attracts the attention of the city people and the travelling public, whether by train, automobile, or however they are attracted in that direction, they will come again. They feel like going into those orchards and looking them all over; there is that something in horticulture that attracts everyone.

Every Vermont farmer should become interested in beautifying his farm; making it more attractive to himself and others. When we set out a nice apple orchard we are setting something that is to remain for two, three or four generations; it is not alone for ourselves; we are not the only ones who are to look upon it; but indeed, the people who are setting orchards now are doing a work that those of the next and succeeding generation will reap benefits from. We know of young people now who are getting immense incomes from their apple orchards, which were planted by their fathers and grandfathers. There is nothing more enduring, nothing from which benefits will more surely result, than an apple orchard in the State of Vermont.

I want to call your attention to the practical value in dollars and cents in the apple crop. We think that apples are very low, but the profit from the apple orchard, thoroughly cared for, will be greater than the profit of any other agricultural interest in Vermont. If we consider it commercially, saying it cost \$1 per barrel to deliver at the railroad platform, and if we can get

no more than \$2 in the market, we are getting double the real cost of our crop. If you are putting up one pound of butter at a cost of 20 cents, and get 25 cents for it in the market, that five cents is five cents profit on the 20 cents' worth of butter. If you could double that and get 40 cents; did you ever double the cost of production in the sale of your butter? It is often the case that we double the cost in the sale of our apple crop, and very often we get three and four and five times above that. Perhaps some good dairymen may object to that, and say that apples don't bring much, and that butter is the thing. Well, I will not say anything against butter; but I do say, combine good apple orchards with good butter. There is a demand for Vermont apples in the Boston, Washington, New York and Chicago markets, they are calling for Vermont apples. Without any very great effort on the part of the Vermont farmer, apples have gone up to such a point in the New York market that they are 75 cents to \$1 per barrel higher than other apples, although Oregon apples, coming in boxes, will come a little higher. Boston has been quoting Vermont apples from 75 cents to \$1 higher than other fruit, and in our own state, the Burlington "Free Press" quotes Vermont apples 75 cents a barrel higher, for certain varieties.

If we can grow an apple that is in great demand, more so than other apples, then there is an incentive to set more apple trees and take better care of them.

As to the method or manner of growing the trees, the brother preceding me has said enough.

In regard to harvesting the fruit, it is important that the farmer, whether he has one or two thousand or ten or twenty or fifty trees, give his attention to that work, do it thoroughly; do it well.

One point as to the variety to grow; make them the winter or late fall varieties. If you are going to keep these apples for market, they want to be placed there in the very best condition; don't think they can be dumped into barrels and shipped to their destination, and think because they have been in the cold storage you can get a remarkably high price for them. The apple must be put in the storage in good condition, or it will not leave it in that shape; it will decay in the storage if it is placed there in that condition. You must have boys or men who will work rapidly and carefully, it is an apple at a time, not shovels-full, from beginning to end, from the time you pick them from the tree until you put them on the market. We are getting so now that instead of putting them in barrels we use packing boxes. That custom has grown to such an extent that Millard of Rouses Point has sent some of his manufacture for you to examine.

They manufacture boxes for all other goods and classes of produce, and now they are making them for apples. I wish you would examine these boxes very closely, and consider in this meeting whether there is any profit in boxes over barrels. If the apples go in barrels to the market, sometimes they are badly jammed, and the fruit must sell low; if they go there in a firm condition, smooth and clean and nice, they bring a good price, and cost no more than those roughly handled. So be careful that the men who handle your apples handle them carefully as possible. As to the time of harvesting, that depends entirely upon your immediate circumstances and the size of your orchard, etc.

Storage. Storing of late fall and winter apples. We would not think today of keeping a dairy of 30 or 40 nice dairy cows, Jerseys, or something else, without a good barn to keep them in. We would not think of running that dairy without proper dairy utensils to make their product just as fine as possibly can be done; yet there are very few farmers in the State of Vermont who have a storage suitable for their apples. They may have 25 or 30 nice dairy cows; they are making fancy butter and getting fancy prices, and yet they have 100 or 200 apple trees and are not getting any profit at all from them.

About the buyers: If they pay enough, sell to them, but beware of the buyer from New York who has lots of cheek, a suit of flashy clothes, a big watch chain, and an eye that will look right through any Vermont farmer and tell what kind of apples are behind the barn. Remember that if you have a storehouse out there, and you take him there, just tell him you have plenty of good room to store your apples unless he will give you the right price; then ask him a reasonable price, no dallying, and don't tell him how hard it is for you to dispose of them; if he buys and pays you then all right, otherwise hold them.

There are quite a good many points along this line. What will I do with them? If you use barrels, put them into barrels; don't put in the cider apples if you can help it; if you have pickers that you can depend on, let them throw the cider apples on the ground, and the good ones in the barrels. It does away with an extra handling of the fruit if you can assort as you pick. After they are picked don't put them under a shed or a tree; put them at once into your storehouse and keep them there until you want to use them, whether it is two days or six months, and then grade them as circumstances may require; suit your own feelings; empty one barrel and put your apples right back into it; if in crates, do the same. If you have no barrels put them into bins. I had 300 barrels of Northern Spies that I put in one large bin, 30 ft. long by 6 ft. high. I thought the bottom

ones would be spoiled by jamming; I used to think I must build up platforms above each other to prevent that, but that is not necessary; those Spies came out just as fine and nice and hard as could be. Never fear to pile apples if your bin is solid and will not give. There are many ways like this that you can store your apples without using barrels.

Shipping the Fruit—If we store our apples and it comes winter, and we hear the winds blowing about and over our islands and along our lake shores, we are very apt to get nervous, and say: "I don't know where to ship; I don't know where to ship; and I don't know how to ship." Perhaps I can give you some pointers along these lines. The time to ship is when the market calls for the variety that you have to sell; if you have Snows, then Thanksgiving and Christmas is the time to dispose of them; and Kings go well then, and Spitzenburgs go well any time after Christmas. Spies go well in February, and Baldwins in March, and Ben Davis any time two years afterwards.

We have got to study our business; get to be students of the market in order to know when these apples are demanded by the market. We must be in touch with the market, if we have 1,000 or so barrels on hand when the market is liable to pay the highest price.

Co-operation—Co-operation is the only way through which we can come to our highest ideals. For 50 men who are in the market to sell 50 small lots of apples, to act individually is radically wrong, something ought to be done; some of us will know pretty well what to do to get results but the rest will not know how or when to act. We must co-operate.

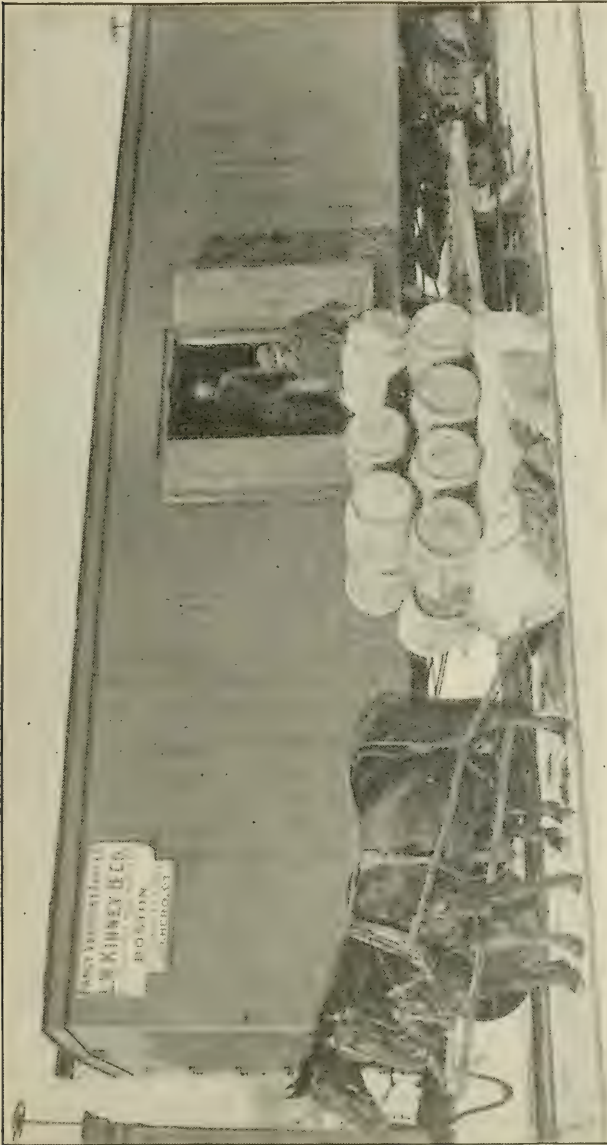
Some of you will say that we have apples enough in Vermont. Our apple crop is one million barrels a year. At \$2 per barrel is two millions of dollars, that is something for us to consider; it is worth while for the Legislature to help us, don't you think? And when the two million dollar mark is reached the four million mark will come soon after.

It is almost an impossibility for an individual, who has, perhaps, 500 barrels of apples, to ship these at reasonable rates, but if several in a community can only just work together and hire a car, you can ship as cheaply as fruit can be shipped anywhere by the car. Appoint one man to look after the shipping. The Snows can be shipped very nicely before it is too cold; and then when the cold weather does come, you can ship the Greenings and Baldwins and Spies all right. Last winter we considered the coldest winter we ever knew, but we shipped a car-load a week all through the cold weather and never froze but one car. We commenced about Thanksgiving in our section, and we worked together. This winter we have shipped a car load

a week until about a month ago when we commenced to ship two a week, and we have had but one car frozen; in that car the Greenings were damaged, so where we were getting \$2.75 for them we had to accept \$2, but for the red apples we got the same. Of course it was some trouble for the commission man; he had to take them out and set them aside to allow the frost to come out, and then put them on the market. There is not much risk. We hire a refrigerator car and make arrangements to hold it all through the season, and we keep that car going. As quickly as it comes back we load and re-ship it. We had a car all loaded about 9.30 or 10 o'clock this morning; it will leave at 3 o'clock for Boston and in 36 hours that car will be in the Boston market; one and a half days. We worked together; we have no by-laws under which we are organized to tie us down, but we co-operate in shipping, and it works well. One man engages the car; he boards up the ends of the car where the ice is placed; papers it over, stops up the dripping places where the ice water runs out of the car and sees that the place where the ice is put in is all solid, then we have a tight car; it is never disturbed. We put in a good deal of straw; at first they used to steal that and also the boards—in fact the railroad ordered the car cleaned—but now we have arranged so that the commission man seals the car and it comes back to us undisturbed and ready to reship. I place a lighted oil stove in the car for an hour or so before we put the fruit in, and that makes the car as warm as can be.

The apple business is the nicest, cleanest, pleasantest business in the world. Yes, of course, if you are careless the apples will freeze on their way to the car, but not if they are properly protected. I recollect one shipment that came about 12 or 14 miles. I told the man when I saw them that the apples were frozen, but he insisted they were not; I knew they weren't half covered up when he arrived, but he stuck to it that they were all right; before he got through unloading I found out that his sleigh had broken down and the barrels were all dumped out in the snow and remained there while he repaired his sleigh, of course they were frozen. It is a perfectly easy matter for a man to place his apples in the car in exactly as good condition as when they left the storage, if he will use a little care and judgment.

Sometimes we line our barrels with paper. If you use second-hand flour barrels you can clean them pretty well, but it is preferable to line them with paper. I noticed a barrel of apples today that had been in the cellar all winter, and just opened, and there was mildew all around the barrel, all coming from the flour barrel, and it gave it a bad appearance; if that barrel had been lined with paper that would have been avoided. Paper saves the wind from passing through the barrel and over



Co-operative shipment of Vermont apples with the thermometer six below zero, South Hero, Vt.
Photo by W. Stuart.

the apples, and keeps them warm. We are now using a specially prepared paper, about which I presume you all understand.

Now about stencilling and marking. There is not a farmer; not one out of a hundred that is willing to have his barrels marked like the Millard stencilling. It is all done with printing presses; you can have the boxes all marked, and have them come to you knocked down. Creamery men have their stencils and papers and boxes all marked. Why don't we do it? Why don't we put our names on our barrels, providing we have good stock inside?

I sent some boxes of apples to Boston this fall, and a few days ago I got a letter from a good business man there, who spoke of seeing a nice box of apples in the Faneuil Hall market, but that all the apples were not as handsome and good as those in the facings. Of course they don't all look quite as pretty. We are not responsible for that. I asked him what the trouble was under the facings; if they were decayed, bruised or wormy, except a little difference in size and coloring. He didn't answer that question. I asked him again about the price, if he didn't pay more to the middle man than he ought to have? He wasn't complaining about the price, but he wanted the Vermont farmers to be more honorable and honest. The commission man cannot sell a barrel if there is a single poor apple in the facings. If the fruit dealer can pick out a poor apple he won't buy, except at a small price. We must be very careful about our facings. If once in a while there is an apple that is not good in a barrel we have got to stand for it; we can't assort them at such prices. I wrote this man to ascertain the price they were paying for that box, and he said they asked him 75 cents a dozen or \$2.25 a box, that was not a very high price. Our boxes are selling for \$2, and if the middle man sells them for \$2.25, if we can get as closely in touch with the consumer as that, so there is but 25 cents on a bushel of apples for the middle man, we are getting much more closely together than I thought.

There is a difference in selling apples to those who are selling in the fall, cheaply, and selling when the proper time comes and in the proper market.

I met one of our shippers this morning. He carries about 800 barrels; he is getting \$1.95 a barrel for Greenings; last fall they wouldn't touch them at \$1 and \$1.25; he has made 95 cent profit on his No. 1 and 2's. Now he has a certain amount of red fruit. He has just sold 3 barrels of Spitzenburgs for \$4 and \$5; he will not sell any more at that price, but says he will get more, and is going to hold them.

I wrote a commission man in Boston a while ago to ascertain the net price, net profit to Vermont apple growers. He

replied that the Vermont apple crop this year was from 4,000 to 5,000 barrels and that the net on the Vermont apples since last summer or early fall trade, was \$1.64 a barrel for everything. No. 1, No. 2, windfalls and everything. Last season we had an immense quantity of windfalls. If the apples of Vermont sold on the open market in Boston at the rate of \$1.64 up to date, what will they sell for from now up to the first of April or middle of March? Why not have a store house, or arrange for storing in your cellar; keep your apples; then when the time and market are ready, combine in your community and ship the apples when and where they will bring the biggest price.

Cost of boxes—After looking about for two or three years, all over the country, I finally, through an advertisement in a St. Louis paper found that a man right here in Rouses Point, my nearest neighbor, had been making these boxes for years. He has different prices; the boxes I have cost me 12 cents each; now they will cost more, about 13 cents, I believe. The Bristol people make one at 23 cents. It takes $3\frac{1}{2}$ boxes for a barrel; they hold a little less than a bushel. These people have been making boxes for Western New York people for years. You write them; Millard & Sons, Rouses Point, N. Y., and they will give you a list and cuts of the different sizes and shapes and prices.

A year ago we sent some boxes, a small shipment, and where our Spies were selling for \$5 a barrel, we sold the boxes at the rate of \$7.50 a barrel. Whether if we had sent a great many we would have received the same price I do not know. The three boxes wouldn't cost any more than the barrel and the freight is no more, so it brings it just about the same, and the boxes can go in on top of the barrels in the car and are out of the way.

Q. Do you consider this box better than a half barrel?

A. I don't like them as well; you can handle a barrel better than a box containing half the quantity.

I recommend that this Society adopt a standard that some other Horticultural society has adopted. I believe the people in Quebec have a box 10 x 11 x 20 and they are endeavoring to make that a legal standard.

About facing up the boxes and filling them: It is quite a difficult task at first to face a box well; with a barrel it is quite different, as it is round and the apples fit in nicely; it takes more patience to face a box well, but when you get used to it, it is just as easy as can be. Your eye will take in the measurements, just the size of apples it will take to fill the box, etc. You can make them come out even on the side, but

at the end they generally will not; it isn't necessary. The California and Oregon people all put their apples in tiers up and down and just such a number in each box, and the number is stamped on the outside. They have experts for packing boxes, and they pack all the year round. But it is impossible for us to do this.

Q. Where do you nail your covers?

A. Only at the ends.

Q. In market when they open the boxes do they open the bottom?

A. Always.

"THE CHERRY."

W. T. MACOUN, OTTAWA, ONT.

Mr. Chairman, Ladies and Gentlemen:—

It gives me the greatest pleasure to get this opportunity of coming over to the State of Vermont to attend this horticulture convention, and I hope to carry away with me much information which will be useful to us in Canada; and if I can assist you in any way here I shall be very glad indeed to do so. As you know we live a little further north than you do, and while our winters are as cold as yours, and our climate is somewhat similar, still there is a little difference, which might affect what I have to say.

I should like before saying anything in regard to the cherry, to call your attention to two or three things to which Mr. Kinney referred, namely, co-operation and the packing of apples in boxes. Those two subjects have been very live issues with us for the past few years, and I am glad to say our government is taking the matter in hand, and assisting the fruit grower very much indeed.

Co-operation during the last three years has gone ahead with rapid strides in the Province of Ontario. The price of apples has been comparatively low, and farmers who handle only a few apples, say 100 or 200 barrels, found they couldn't market them at all; practically they were driven to co-operation, and in some districts these co-operative associations have sprung up, and are working very satisfactorily indeed. There were some obstacles to be overcome at first. The farmers throughout the country did not have spring wagons, and it was difficult to get their fruit to the central packing house in proper condition. But this was overcome quite easily when it was looked into. I must say that the most successful co-operative association which

has come under my notice is run on the following plan: There is a central packing house at the railroad station to which the farmers bring their apples. There is a manager and an expert packer there, and as soon as the apples are brought in they are inspected, graded and packed by the packer, and the farmer is credited with so many No. 1 and No. 2 and No. 3, of the varieties he brings in. The No. 1's from all the farmers are placed in one pile, and the buyer comes and offers a price; when a sale is made every farmer gets his proportion. That is found to work very satisfactorily.

To overcome bruising, on the apples coming from the country, a little hay is put in the bottom of an ordinary hay wagon; the hay gives some spring to the barrel, and it is found that the apples arrive in perfect condition.

There is no difficulty in regard to the grading of the fruit, although it would appear there might be. Only a certain sized apple, a certain percentage of poor fruit can go in the best grades and the No. 1's, No. 2's and No. 3's are separated without difficulty.

Since these co-operative associations have been started buyers have come to these districts who would never come there before; they knew it would not pay them; they are now glad to come where they can find large quantities of fruit put up well.

I am sure if you adopt a co-operative system here in Vermont you will find it practical and satisfactory.

In Canada we have to ship the most of our apples which we have for export to Great Britain, there is such a duty coming into the United States it is not possible to ship them here with much profit. Our market in Manitoba is opening up, but the principal point is Great Britain. We find in shipping there it is necessary to have a uniform package, the same as we do with our butter and cheese, for if we have uniform packages we expect to receive better prices for our produce. There is a legal barrel in Canada, but when boxes began to be used more it was necessary to get our fruit growers' association to adopt a standard size of box. Unless we could get the fruit growers interested in this matter and get them to adopt a uniform box it was not possible to get the Legislature to do anything. The principal fruit growers' association in the Dominion of Canada have adopted the size of a box spoken of by Mr. Kinney, 10 x 11 x 20 inches inside measurement. The reason this size was adopted was because in British Columbia and in Oregon, and I think in some parts of California, they have adopted this size box, and as a great many of these go to Great Britain and Europe, we thought it better to adopt a size exactly like that they were sending. There is a bill in Parliament at this session which

was brought up the other day, which will make this a legal box in Canada, 10 x 11 x 20 inches, almost a bushel.

We have been able to buy this box at from 12 to 14½ cents, with all the stencilling on it that we desired. It has been found that one can get a box cheaper by adopting one with a cleat along the ends, which also gives a handle to the box. The reason they can be made cheaper is that small pieces of board may be used for the ends of the box.

I may say that the "Fruit Marks Act," which was established about five years ago, making it illegal to face a barrel wrongly, with large apples on top and small apples inside, further down, that that Act is working very nicely indeed. There was some little difficulty at first in getting packers to come up to the standard required, but we have a number of inspectors who go around to the packing houses at different times and the dishonest man is soon found out, and he is visited more often than the others, and they have to allow their barrels to be examined. We find our apples are getting a much better name in great Britain and Europe than ever before, and that this Act is working very satisfactorily indeed.

Q. Member: How about the coloring?

A. They allow 10% difference between the color of the fruit in the face and the interior of the barrel; the face can be 10% more colored.

Q. You have official packers or inspectors?

A. Yes sir, appointed by the Government.

Q. Members: Tell us about their duties.

A. The situation in Canada is slightly different from that in the United States. Nearly all your laws are enacted by each individual state. Some of our principal laws are enacted by the Federal Government covering the whole Dominion. An Act like this covers the whole Dominion, from one coast to the other, all provinces are subject to this law. It makes it much more easy to carry out the provisions. The way it is managed is this: There is a Chief Inspector who has his head office in the departmental building at Ottawa. Under him are a number of inspectors, who are placed in the principal packing and shipping centers. They are at liberty to open any barrel or barrels of any shipment that is sent to any port, and if it is not up to the standard they can put a stamp on it, "Falsely Marked." At the first offence they caution the packer, and if it occurs again he is fined. You can easily understand that after an inspector has been working for a short time he gets to know the men who are in the habit of putting up fruit falsely, and is on the lookout for them, and they soon stop it.

Q. Is the name required to be on the barrel?

A. The name and address are on each barrel so the responsibility can be traced immediately.

Q. What is done with the barrel that is not up to the standard: is it allowed to go in to the market, after it is condemned?

A. Yes, if the shipper likes he can send it, but it is branded "Falsely Marked."

Q. Is there a penalty?

A. Yes, I forget what it is, but it is sufficient to stop anyone from doing it. The law is working very satisfactorily indeed, and although there are some barrels that still escape the inspector's eye, yet the number of barrels that are falsely marked are growing less every year.

"THE CHERRY."

I do not know that very many of you have any special interest in this fruit. Although this is one of the most popular fruits to be had it is the most unpopular fruit to grow commercially. I have had occasion to get information from every state in the United States and from all parts of Canada and I find it is in very few states indeed that the cherry is grown to any extent, although cherries can be grown from Maine to Dakota and from Dakota to Georgia, yet, although there are some large cherry orchards in a few states, it is not grown to any extent. There are several reasons for this. One is that the cherry has to be handled in a very short time. It is a perishable fruit, so full of juice it goes by very quickly, and unless there are pickers to handle the crop it is wasted, and as it comes early in the season it is sometimes difficult to get pickers. Then another thing, unless the crop is disposed of almost immediately there is not much profit in it. You can't hold cherries as long as you can apples for instance. Then the buyer does not of course like to handle a very large quantity of the fruit for unless it is consumed very quickly it goes bad on his hands. There is not the temptation to plant large cherry orchards as there is apple orchards.

These are the principal reasons why cherry growing has not developed as rapidly as it might, but every one should grow a few cherries for his own use, and then the question may be asked: "Why are not more cherries grown around the home?" There are two reasons for this: One is on account of the black knot and the other is because of the birds, both of which are troublesome, the latter so much so that often when one has a good crop one seldom gets sufficient for his own use. Both these difficulties can be overcome if we want to have

cherries. Of course it is more expensive than it would be if we did not have these enemies to contend with. At the same time it is quite easy to get rid of them. The black knot disease comes from careless cultivation. There is no necessity of having black knot in the orchards or gardens because it can be gotten rid of and prevented the same as any other diseases. The disease is spread by means of spores which are blown or carried through the air by the wind; these alight on the trees and in the leaves or in the flower buds and when the conditions are favorable these little spores germinate and penetrate the stem of the cherry and then this disease goes through the branches and ruins the trees in a short time. It comes to the surface to produce its seeds or spores. This is the time that we see this knot developing. If you are observant you will find the small knots are of a light color but these gradually enlarge and toward the month of June become of a fluffy or velvety appearance, and just at this time you will find the spores are all ready to be blown through the orchards and reinfest the trees again. In order to check the disease one must get rid of the knot as soon as possible, because when they get to this velvety stage it is almost impossible to get rid of them before the spores spread. If the knots are on small branches they should be cut off three to six inches below the swelling and burned; if it is not advisable to do this, the branches being so large as to injure the tree, they should be cut out and the wound painted over with kerosene. Kerosene will destroy any spores that are alive. If there are very large knots that cannot be cut off you can paint them with kerosene. It is well to mix a little coloring matter with the kerosene so you can tell just how far the liquid extends. Kerosene will injure the healthy wood and cause more injury than the knot itself, so confine it to the diseased part of the tree. It will destroy the black knot, and it should be destroyed as quickly as possible. It is not only advisable to destroy the knots, but if you have a spray pump the tree should be sprayed as you spray for scab. Spray just before the buds break, and before the flowers open and 10 days afterwards, by giving them these three sprayings it will entirely destroy all spores that have come in contact with the trees. This may seem a long and difficult way of getting rid of the disease, but if you will do it you will have no black knot. It is perfectly certain that black knot can be prevented by this method, because some of the best growers are not troubled at all.

In regard to the birds, we know that robins especially do a great deal of damage to cherries. In Germany and Great Britain where they have been troubled with birds the same as

we, they have resorted to covering their trees with netting, and it is found to work very satisfactorily indeed. It is a little expensive at first, but when the net is only used for a short time each season and will last for a long time. We have used this net for some time, obtaining it from England, second-hand fish net. You can get any size; and you simply cover the tree and it will prevent the robins from getting into it.

The culture of cherries is simple, but for the information of those who are thinking of growing it commercially, it may be well to say a little about it. Cherries succeed best, as a rule, on well drained sandy loam soil in which there is always a good supply of moisture. They will do well also on heavier soil if drained. When it is possible to obtain it, a site near a large body of water is very desirable as the flowers of cherries are tender and moist, cool air from the water prevents, to a certain extent, sudden changes of temperature. The soil should be thoroughly prepared as for a crop of roots. Two year old trees are the best to plant, and the most suitable distance is from 16 to 20 feet apart each way, depending on the variety. If they are planted 18 feet apart each way it will be sufficient for most of our kinds of sour cherries. If the tree is low-headed, the trunk is protected from the sun, which is desirable, and the fruit is brought nearer the ground. The trees should be pruned at first to make them symmetrical and to take out any limbs which interlace, after which the less pruning that is done the better. The sour cherries begin to bear from three to four years after planting, the English Morello being among the first to fruit. For commercial planting, the Early Richmond, Montmorency, Louis Philippe, Ostheim and English Morello are among the best. Sweet cherries cannot be grown successfully for commercial purposes in Vermont.

Dwarf or Bush Cherries. At the Central Experimental Farm, Ottawa, Canada, the flower buds of the sour cherries are usually either winter killed or injured by spring frosts and it is rarely that there is a good crop of fruit. On account of this, efforts have been and are being made to obtain a cherry which will bear fruit regularly. All, or nearly all, of the named varieties of Russian cherries introduced into America have been tested, and while a few of them are hardier than Montmorency and Early Richmond none of them are satisfactory. The hardiest are Orel 25 and Vladimir and these seem distinctly hardier in flower bud than the others. The Vladimir is, however, small and on this account is not valuable; the Orel 25, therefore, is the most useful Russian cherry tested. It is a bright red variety with colourless juice, much resembling Early Richmond and

Montmorency. Seedlings of this are being grown in the hope that they will prove hardier.

We believe, however, that there is a greater future with us for dwarf or bush cherries than for the larger trees and as they will be more easily protected from birds, easier picked, easier sprayed, and in the North protected by snow, which at Ottawa is three to four feet in depth among bush fruits. It may be of interest to describe the material on which we are working in order to obtain a dwarf cherry which will be worth growing even where ordinary sour cherries succeed.

Koslov Morello (Bush Cherries)—In 1890 the Ontario Fruit Growers' Association received a number of seedling cherry trees from the late Mr. Jaroslov Niemetz, Winnitza, Podolie, Russia. Twenty-one of these were sent to the Central Experimental Farm, Ottawa, for test. They were slow in coming into bearing and when they did fruit, all were different. Eight years after planting when they began to fruit these trees averaged only 5 feet 6 inches in height. Most of them produced fruit of inferior quality, some being bitter and others being very acid. Two, however, were quite promising, owing to their superior hardiness, lateness in ripening, large size and quality of the fruit. They are of the Morello group. The trees are very low growers and Mr. Niemetz, from whom they were obtained, recommended growing them from the stone, but there is so much variation in productiveness that we do not think this would prove satisfactory in America.

The following are descriptions of two of the best which have fruited at Ottawa: *Koslov Morello No. 1*—Fruit large, long, heart-shaped, slightly flattened, firm: stalks very long, slender: suture rather indistinct: colour deep red: flesh deep red: juicy, very acid: ripe July 26th, to August 8th. Makes excellent preserves. Height 12 years after planting, 5 feet 6 inches, breadth 8 feet 6 inches. In 1902 two pickings were made from this tree, one on August 2nd, and one on August 8th, the total yield from one tree being 26½ lbs.

Koslov Morello No. 2—Fruit large, heart-shaped, rather deep red, firm: stalk long, stout: suture distinct: flesh bright red, very acid. Ripe July 26th. Makes excellent preserves.

If such bushy trees as these were on the market they could be planted 10 to 12 feet apart. At ten feet apart, 435 trees per acre could be planted, which at 26½ lbs. per tree would mean 11,527½ lbs. of fruit per acre, which at 6 cents per lb. would be a gross return of \$691.65. Reckoning at half the crop mentioned it would mean a gross return of \$345.82 per acre. The average yield per tree of the Montmorency cherry is about 25 lbs. Planted 18 by 18 feet apart there would be 130 trees per

acre, producing 3,250 lbs. of fruit, which at 6 cents a pound would amount to \$195.00 gross return per acre. The returns from these bushy trees would hence be twice as much or more than from the large trees, and the fruit would be much easier handled.

Prunus tomentosa or Downy-leaved Cherry—As far as I am aware, there is no common English name for this small tree and the one just mentioned is a direct translation of the Latin name. This cherry, which is closely related to the apricots, is a native of Northern China and Manchuria. It has proven hardy in the fruit bud at Ottawa and is, I think, a very promising dwarf cherry for districts where the sour cherries do not succeed. The largest trees of this cherry at Ottawa are about 5 feet in height and from their appearance would not be recognized as cherry trees unless the fact were known. The fruit ripens about the middle of July at Ottawa. The cherries are borne singly on very short stems less than $\frac{1}{2}$ inch in length and are as large as a small sour cherry or somewhat larger than a very large black currant. They are bright red and rather soft with a moderately distinct suture not at all depressed. The flesh is rather pale red and very juicy, mildly sub-acid and with a pleasant, but not high flavour. There is no astringency. The stone is of medium size, leaving a good proportion of pulp. This is quite good when canned or preserved.

Sand Cherry (*Prunus pumila* and *Prunus Besseyi*)—The Sand Cherry is well known. While the average fruit is quite inferior, the Sand Cherry varies much in size and quality. It is very hardy and a heavy bearer. Thousands of Sand Cherries are now being grown by Prof. Hansen, of the South Dakota Experiment Station, and some good types have been obtained from which he hopes to improve this fruit still more. Sand Cherries are much appreciated where the sour cherries do not succeed.

Compass Cherry—This cherry was originated by H. Knudson, Springfield, Minn., and it is said to be a cross between the Miner plum and the Sand Cherry. It has proven a very heavy cropper at Ottawa and its usefulness in Northern districts is not fully appreciated yet. This becomes a larger shrub than the Sand Cherry, but resembles the latter very much in foliage, though it can easily be distinguished from it. The fruit is about as large as a medium sized Montmorency Cherry and is dark red in colour. The quality is decidedly better than the Sand Cherry and when canned, the juice of it resembles the juice of the sour cherry very much; the fruit itself, however, though fair eating is by no means equal to the sour cherry. The Compass Cherry bears young and is very hardy in the flower bud. It

ripens about the middle of August at Ottawa. Seedlings from this may be even more useful.

Prunus Japonica—This is classed with the cherries although this shrub, like *Prunus tomentosa*, does not resemble a cherry very much. It is only about three feet in height, but bears a good crop of fruit every year. The fruit is about the size of a Fay's Prolific currant and deep dull red in colour. The quality is rather poor, but this species may prove useful either as a stock or in cross-breeding.

Seedlings of the Koslov Morello, Compass Cherry, Downy-leaved Cherry, and *Prunus Japonica* are being grown at Ottawa in the hope of obtaining something better than the original, and as time permits, work in cross-breeding will be carried on also. Some of these may also be useful as dwarfing stocks for the ordinary cherries as at present there is no satisfactory hardy really dwarf stock used. The Mahaleb does not dwarf sufficiently and is not hardy enough for the North. It appears to us that there is a good field here for useful work.

SUGGESTIONS ON THE PREPARATION AND USE OF FUNGICIDES AND INSECTICIDES.

BY WM. STUART.

The replies received from a circular letter recently sent out to the fruit growers of the State revealed the fact that but comparatively few of them had paid any attention to spraying the past season. Out of ninety-six replies only seven reported having sprayed at all. Of this number, one sprayed four times, one three, one twice, and four once. Twenty-five reported having more or less scab on their fruit, nine reported damage from codling moth and thirty-one from apple maggot. The fact that twenty-five percent from whom replies were received reported the presence of apple scab, suggested that this fungus was again becoming abundant and widespread as indicated by the different counties of the State from which the reports were received. Should climatic conditions favor the growth of the scab fungus the coming season it will undoubtedly cause a large amount of injury to unsprayed fruit trees. The absence of apple scab in any appreciable amount the past two seasons, following as it did the unprecedented season of 1902, in which sprayed trees suffered almost as badly as unsprayed, has done much to make the fruit grower careless and even to cause some to regard spraying as an unnecessary evil.

As the Bordeaux mixture is practically the only fungicide employed by Vermont fruit or potato growers, it is for that reason given precedence over all others. It has seemed to the writer that aside from the causes previously mentioned, as regards fruit trees, that there are three main reasons why spraying is not more practised than at the present time: (1) owing to inadequate facilities for preparing the spray mixture; (2) to inefficient pumps and nozzles; (3) as a result of the foregoing deficiencies, and oftentimes to an improperly made mixture, the benefits derived are not sufficiently apparent to justify a continuance of spraying. The remedy for these objectionable features, while evident, is in many cases not easily overcome.

For the past two seasons the horticultural department has been engaged in an attempt to simplify the process of making Bordeaux mixture¹ or, at least if not to simplify it, to render it feasible to make a perfect spray mixture with as little labor as possible. The result of this effort culminated last season in a system which in principle at least is considered quite satisfactory. At the outset the two main objects in view were to reduce the labor of preparing the Bordeaux and to insure as perfect a spray mixture as possible.

The Gravity System—To lessen the labor of preparing the material the first thing to avoid was that of lifting the solutions. To obviate this a lean-to shed was made to serve as a support to a two-tier platform, the lower of which was of sufficient height to allow of filling the mounted spray tank, from the mixing vessel setting upon it, by means of gravity. All vessels used were of wood and consisted entirely of barrels. On the upper platform was placed the stock solution and dilution barrels, the former in rear of the latter. The stock solutions were made so that each gallon of the solution represented one pound of the copper sulphate or of the lime. The formula used in making up the Bordeaux was that known as the 1-10 formula, that is, one pound of copper sulphate and one of lime to every ten gallons of water. Hence in making up fifty gallons of Bordeaux, all that was necessary was to transfer five gallons of each of the stock solutions to the dilution barrels, and fill them up with water to the twenty-five gallon mark. Each of the dilution barrels was provided with a faucet so placed as to remove all liquid from the barrel. The barrels were turned so as to bring both faucets close enough to each other to discharge in a pipe connected with the mixing barrel on the lower platform and into which it passed through a strainer. In the same way the

¹The Seventeenth Annual Rep't Vt. Agr. Exp. Sta., 1904, pp. 440-442, contains essentially the same statements regarding the *gravity system* and *stock solutions* as is presented below.

mixing barrel was provided with a valve and pipe extending out over the spraying outfit and through which, by means of an elbow at the outer end, the liquid was conveyed to the spray tank. With this method of preparing Bordeaux mixture, the only lifting necessary is that involved in elevating the lime and copper sulphate and in transferring the stock solution to the dilution barrels. With the opening of the faucets in the dilution barrels and the valve from the mixing barrel, the whole process by the aid of gravity, becomes self operative. The contact of the two liquids in equal volume and strength in the pipe leading to the mixing vessel is the beginning of a perfect mixture which is further completed on the strainer and in the mixing barrel. More perfect conditions could hardly be secured. In objection to this method it may be urged that it is only feasible where water under pressure is available. It is conceivable to the writer, however, that this objection might be met by the erection of elevated platforms over or at one side of the well, and by simply lengthening the pump stock sufficiently to raise the pump to the desired level, the water could be delivered on the upper platform with comparatively little extra effort. The cost of erecting such a platform is slight as compared to the ease and comfort derived from its use.

Stock Solutions—One of the easiest ways of preparing stock solutions is to use a vessel of known capacity, fill it with water to the desired point, then enclose the required quantity of copper sulphate crystals in a coarse sack, such as a bran sack, and suspend them in the water from a stick or board laid across the barrel. The crystals will dissolve more quickly if not too deeply immersed in the water. In the case of the lime weigh out the desired amount and slake it in a barrel, adding just enough water at first to prevent burning and at the same time thoroughly slake the lime, after which it can be made up to the required volume with water.

Some authorities recommend a stronger stock solution of copper sulphate than that mentioned, that is, instead of one pound to a gallon, two pounds are used; and others advise a saturated solution, claiming for the latter that when such a solution is used no change in its strength can occur by evaporation, as it is always at the saturation point. A saturated solution contains about three pounds of copper sulphate to the gallon. If the weaker standards are used the only precaution necessary to observe when carrying over a stock solution is to mark the height of the liquid in the barrel and restore it to its original volume before using.

The sulphur sprays are at the present time receiving a great deal of attention, and deservedly so, for they are proving an

effective agent in the treatment of dormant trees for the scale insects and in many cases for fungous diseases. For Vermont conditions the sulphur sprays do not have any particular application, because as yet the San Jose scale has been found in but two orchards in Vermont, both of which have received vigorous treatment and are more or less isolated, and the oyster shell bark louse is amenable to a more simply prepared remedy, such as a lime wash at the rate of from one to two pounds of lime per gallon.

One of the newest insecticides for scale insects seems to offer some possibilities of combination with the Bordeaux mixture and thus form an ideal insecticidal and fungicidal spray solution. This new insecticide is called the Kerosene-Limoid mixture, ⁽¹⁾ and was originated by Close of Delaware. The Limoid is a specially prepared finely divided lime and magnesia which readily absorbs kerosene and forms a perfect emulsion with it on the addition of water. Four pounds of fresh limoid will take up one gallon of kerosene. In preparation, the kerosene limoid emulsion is so much more simple than that of the kerosene emulsion of kerosene and soap that it will unquestionably supplant the latter. The formula for a twenty-five gallon, ten percent mixture, is as follows:

Kerosene2½ gallons.

Limoid10 lbs.

Water22½ gallons.

This mixture is best prepared in a barrel or other convenient vessel. First add the kerosene, then the limoid, and stir vigorously until thoroughly mixed into a thin creamy mass, after which add from five to ten gallons of water and stir again to throw the whole mass in suspension in the water. When this is accomplished add the remainder of the water and thoroughly agitate the liquid again, this time preferably by pumping it back into itself. A three minute agitation of this sort will insure a perfect emulsion that will remain in suspension and that will flow through the Vermont nozzle almost as freely as water. Laboratory tests by Close have demonstrated that the kerosene will stay emulsified for several weeks.

In addition to the use of the kerosene-limoid as an insecticide it has been found possible to combine it with the Bordeaux mixture and with arsenical poisons. Further experiments may demonstrate that in the kerosene-limoid-Bordeaux-arsenical mixture we have a spray mixture that is effective against sucking and chewing insects and also against fungous pests. In Ver-

¹Close, Del. Sta. Press Bulletin 14 (1904),

mont the kerosene-limoid emulsion should prove particularly effective against the oyster shell-bark louse and the aphides.

Arsenites are employed in combating the codling moth. These are usually applied in connection with the Bordeaux shortly after the blossoms have fallen. Success in combating the codling moth depends very largely, if not wholly, upon the purity of the arsenical poison used, and the ability of the operator to apply the spray so thoroughly that the calyx end of every fruit shall receive some of the poison. It is needless to say that spraying for the codling moth must be done after the fruit has set and before it has begun to turn downward. Generally speaking, the trade paris green of today is variable in its arsenical content, and is not considered as reliable an insecticide as some of the newer preparations now being manufactured. In the writer's judgment the arsenate and arsenite of lead are the best arsenical poisons now in the trade. The arsenate of lead, which is considered the best, is formed by combining lead acetate and arsenate of soda. Various preparations of these substances are now on the market and are known to the trade as Disparene, "Pink" and "White Arsenoid," etc. The prepared forms are considerably more expensive than the raw materials which are its essential insecticidal components.

Station trials of arsenites during the past season.—The horticultural department wishing to give the arsenate of lead a thorough trial ordered a supply of lead acetate and arsenate of soda from one of the leading New York chemical supply houses, and in due time received packages supposedly containing what had been ordered, the accompanying bill being made out according to the order sent in. On opening the boxes it was found that the arsenate of soda was labelled arsenite of soda. Inquiry of the firm elicited the information that only one commercial article was carried, which was a mixture of arsenate and arsenite, and that it went under the name of arsenate or arsenite of soda and was always given when either of the two were ordered. The reply also conveyed the information that true arsenate of soda was only handled by the firm as a pure article, put up in one and five pound bottles at cost of thirty cents per pound, as against nine cents for the technical mixed article. If this illustration is an example of the trade in general, then it is questionable if there is any genuine commercial arsenate or arsenite of soda, and arsenate or arsenite of lead spray mixtures. At any rate the indications are that in some cases at least it is open to question. In making up fifty gallons of the arsenical solution, 21 ounces of lead acetate and 4 ounces of arsenite of soda (?) were used. The lead

acetate and arsenite of soda (?) were dissolved in separate earthenware jars. The former dissolves most readily in warm water, about two quarts being used, and about one quart for the latter. When completely dissolved the solutions were poured together in the spray tank and water added to dilute it to the proper volume. The main use made of the arsenite of lead (?) was in spraying potatoes, and for this purpose it was combined with the Bordeaux mixture. Used in the proportion mentioned it proved as effective, if not more so, than 8 ounces of paris green in the same volume of water and adhered to the leaves much better. When used alone some milk of lime should be used to neutralize any excess of soluble arsenious acid and also to make it more adhesive.

Cost—The cost of the materials for a fifty gallon solution is considerably greater than that of Paris green when purchased in bulk.

21 ozs. of lead acetate at 11c per lb.....	14.4c
4 ozs. of arsenite of soda (?) at 9c per lb....	2.3c

Total cost per 50 gallons.....16.7c

A paris green solution of the same volume would cost somewhat less than half as much. When purchased in bulk, paris green can be obtained for from 14 to 15c per pound, depending on the amount purchased. As a matter of economy in first cost, the paris green is plainly the more economical to use. Based on effectiveness, comparative immunity from injury to foliage by burning, and greater adhesiveness, the arsenite or arsenate of lead is to be commended as a valuable insecticide for chewing insects.

Use of fungicides and insecticides. Fungicides and insecticides are used for the specific purpose of preventing or controlling fungous or insect pests. In order, therefore, to use them intelligently, some knowledge of the life history of the fungus or insect is essential to its control or destruction. We must know what kind of a fungicide or insecticide is most effective against this or that pest, and at what particular time an application may do the greatest harm to the fungus or insect, or give the fullest protection to the plant treated. One application at the proper time is worth a dozen at the wrong time.

Success in the use of fungicides or insecticides may be said to be dependent on the following factors (1) on their proper preparation, (2) in applying the most effective remedy at the right time, (3) in the thoroughness of the application. The writer is inclined to the belief that too little attention is ordin-

arily given to the preparation of fungicides and possibly to insecticides, though not to the same extent as the former. Then, again, the time of application is not always wisely chosen. For example, the first spraying for apple scab should always be made before the buds have swollen very much. A spraying at this time will ordinarily do more toward ensuring freedom from scab than subsequent ones, the ultimate success is, however, dependent on one or two subsequent ones, say one shortly after the blossoms fall, followed by another from 10 to 14 days later. In the same way the codling moth can only be controlled by spraying with arsenites, which may be added to the second Bordeaux application for scab, shortly after the blossoms fall.

Spray Outfit—To effectively apply a fungicide or an insecticide necessitates the use of a spray pump capable of maintaining a sufficient pressure to develop through a suitable nozzle a fine misty spray. The greater the pressure maintained the more finely divided will the spray particles become, and consequently the more uniformly and completely will the foliage, fruit, twigs and branches be covered and thereby protected. Successful results cannot be obtained with an inadequate pump or nozzles. Neither can spraying be conducted most economically with such an outfit. It not only does less effective work but, in addition, consumes or wastes more material. For large orchards power sprayers are the most economical and satisfactory. For smaller orchards some of the many hand power spray pumps, if of sufficient capacity and properly operated, will give fairly good results. The time is coming, in fact has come, in some sections, when progressive fruit growers will co-operate in the purchase of large power sprayers, which will be made to serve for a number of orchards and be operated by some competent person. Each fruit grower to pay according to the amount of material used and time consumed. When such conditions obtain in the best fruit sections of Vermont or in the best potato sections, then, and not till then, will she obtain the fullest recognition for her products.

HORTICULTURE AND ITS RELATION TO THE HOME.

BY MRS. MARY A. SMITH, MORRISVILLE, VT.

In considering this subject we will not ask you to accompany us to any foreign shore, although the first horticultural societies were organized in the old country; neither to Canada nor any of the large states in the union with their fruits, flowers

and horticultural societies; but to Vermont homes and to Vermont horticulture we invite your attention.

Agriculture is the basis of *all* wealth and prosperity of the nation and of the world, and Vermont, though small in size, has not been altogether small in achievement along agricultural lines. Our experiment station is an acknowledged authority, and the individual farmer has accomplished something in some directions, they are less conservative, more inclined to "prove all things," to more fully realize the importance and supremacy of their calling and look upon themselves as men having equal rights with other American citizens.

The legislature of 1904 will be historic in several things it failed to do, but it will always be told to its credit that it made the building of Morrill Hall a possibility. This will mean so much to the dairyman and agriculturist in our state. Especially to the boys and girls will this be a blessing. We who are interested, and those who at present are not awake to the possibilities of horticulture within our borders, will hold the legislature of 1904 in grateful remembrance.

No man today has any need to blush because he is a farmer, but rather press on to greater successes. Is he not a peer of any man, and does he not hold the nations' bread in his hand?

The representative farmer can not afford to be, or allow himself to become a man of one idea. He should not only be conversant with the work on his farm, understanding the principles involved in plant and animal life; but he should try to become acquainted with other farmers and strive to learn their methods and surrounding conditions. This investigation should not be confined to agricultural interests entirely. The broad minded man will study the conditions of all classes of people and an unprejudiced comparison will in most cases cause him to magnify his own calling.

Civic and educational interests should also be looked after by him for they are of vital importance to himself and to his family. Neither is it well for a man to devote all his thought and industry to any one line of farming.

I contend that from a financial standpoint, diversified farming is preferable, and certainly the more lines of thought exercised, to a certain extent, the more intellectual power will be developed. The more thought and study put into the farm and the farm home the more will we enjoy and prize them.

How can a farmer's work be called drudgery and his life a humdrum? There is so much that elevates and inspires him, living as he does in such constant touch and close sympathy

with nature. He only needs to be the intelligent master and she lays at his feet blessings rich and beautiful.

In his very able address at Montpelier a short time ago, Professor Hills told us what wonders science has done for the dairyman; but the dairy farm with its ten or its fifty cows is incomplete in its construction and mission unless it has its garden, its fruit orchard and its flowers. It presents a narrow one idea appearance, and would indicate that its owner had become so intent in making the dairy farm yield dollars that he was losing sight of much that is beautiful and healthful in country life.

Right here let me say, that while we are on the farm as a business and should meet and solve its problems in a business like way; yet to bend every energy from daylight to dark, from week's end to week's end, and from the year's beginning until its close, in the getting of money is living far below one's privilege. It is not all of life nor the best of success to be able at the year's end to say that there is a good margin on the right side of the farm accounts.

Surely we must admit that every farm, whatever its size or whatever branch of agriculture is made a specialty, is incomplete without its garden for fruits and flowers. So much can be raised from a small plot of ground if rightly managed. Home grown vegetables are so appetizing when converted by the skillful housewife into nutritious soup, tempting garnish, or savory salad. Follow this with a fruit dessert, of which there are a hundred and one kinds, all delicious, and you have a dinner fit to set before kings, and it is nearly all grown within a stone's throw of the kitchen door. Who but the farmer can live so sumptuously?

A diet composed largely of fruit and vegetables is believed to be a very healthful one. What other one thing is more conducive to happiness and prosperity than health? This shows plainly that health should be considered. Then let us urge the raising of vegetables for the family's use.

"Whence comes the beauteous progeny of spring!

They hear a still small voice, 'Awake!'

And while the lark is on the wing,

From dust and darkness break:

Flowers of all hues

Laugh in the gale,

Sparkle with dews,

And dance o'er hill and dale."

These beautiful gifts of God were sent to cheer and bless us. Flowers minister to the finer elements in our nature just

as truly as food strengthens us physically. To be sure we can live without them but the life will not be rounded out as full and satisfactory. Need I say plant flowers? In every spot and corner plant them. Make the waste places about your dwellings blossom like the rose.

Have some plants in the windows to cheer and brighten the dark days of Vermont's cold winter. You will not find them a financial success, but their refining, elevating influence will go with you all down the pathway of life. Flowers tactfully given will do more good than the money they cost you doubled.

Someone has said that, "The orchard tends to soften and humanize the country, and give the place of which it is an adjunct, a settled domestic look." This is true, but not half the truth. We are glad that the possibilities of fruit raising in the state are being realized.

Let us go back in mind to the time when the Vermont dairyman's association was organized. Think for a moment what the dairy interests were then. Note if you will what they are today. I predict for the horticultural society of Vermont the same onward and upward stride and the same inspiring helpfulness.

While we commend the cultivation and use of fruits, let us not be remiss in protesting against their abuse. Remembering that

"Satan, too wise to try his former plan
Tempt, in another way the race of man;
Foreseeing in the apple no excuse, decides, this time,
To try the apple's juice, through this,
To wine, and beer, the danger grows,
Till all man's shame is written on his nose."

Our homes scattered up and down these rugged hillsides and through these valleys are what we make them. Let us if possible make them ideal homes. We can adorn our dwelling places with flowers, spread our tables with wholesome, healthful food and fill our homes with a spirit of loving kindness that will diffuse itself on all who enter.

Would that the good influences ever going out from these Vermont homes might be as beautiful as her flowers, as pure as her sparkling waters and as lasting as her rock-ribbed mountains.

Life has its trials, whatso'er our lot,
But if there be, on God's dear earth one spot
Crowned more than others with his favors lent,

Sure 'tis the farmer's home. All sweet content,
All peaceful heavenly influences meet
To purify, enrich and make it sweet,
Within, without, around it and above,
Good thoughts, blessed angels, peace and love.

"HORTICULTURE AS COMPARED WITH OTHER PROFESSIONS."

PROF. L. H. BAILEY, ITHACA, N. Y.

Mr. President, Ladies and Gentlemen —

I have much hesitation in making my maiden speech in Vermont. From my earliest recollection the subject that was most talked about at the family fireside was Vermont; all things that were true and of good report came from old Vermont. So in my youth Vermont came to be associated with all things that were worthy of emulation, and I looked upon it with a sort of sacredness which I don't care about defiling by trying to make a speech in it.

It is a great pleasure to me to be with you, because you are a young horticultural society—only ten years old—and because you are trying to promulgate all these horticultural ideas, both new ideas and old ones. If a society like this continues to hold its meetings, even though at first not very large, the final results will prove to be a great educational influence on the agricultural interests in general, as well as to those of horticulture in particular.

What Professor Stuart, your Secretary, had in mind when he asked me to speak to you on the subject, "Horticulture as Compared with Other Professions," I do not know; what I have in mind you don't know and you never will find out. If I were to illustrate the subject as lucidly as I should like, instead of giving a theoretical talk as to the comparative outlook in horticulture as compared with other occupations, I should cite you actual cases of men and women who have gone into horticultural pursuits and have made a success, as they measure success in life.

Perhaps you feel that a professor is not the one to speak to you about the relative merits of different vocations as a means of making a living, because he himself is not a practical man. I should deny the allegation, of course, in regard to myself. But even though that allegation were measurably true, nevertheless, I should say the professor is the one man to talk to you about the practical value of some of these agricultural voca-

tions because he sees the men and women engaged in these occupations throughout the length and breadth of the country; if he were to bring you only his own experience, and it was successful, in a commercial sense, you might say that he was fortunate in having some unusual combination of circumstances; but if he could bring you the experience of a thousand men and women whom he has known, you would be obliged to believe.

Your professors in the colleges of agriculture can bring you such illustrations; I could bring you them, if I had the time. I have seen these young men and young women all over this country, showing that horticulture is not confined to certain regions. I recollect very well two parts of the country which are not only remote from each other, but unlike in physical conditions. I was speaking to a convention not far from Los Angeles, where the rainfall is very small; and I was told that Southern California was the best; that there they could grow the best and the largest crops. Shortly after, I addressed a convention in Nova Scotia, where the physical conditions are entirely different; and there I was told that of all places Nova Scotia was the place to live in, the place in which to grow apples; it was "the" apple growing country. Now, today I hear the same thing in Vermont. We believe Western New York is the place of all the places in which men should live and engage in horticulture. These examples show that success in horticulture is not local.

Perhaps we cannot grow as good apples as you can; I suppose this northern region; the Canadian region, and Nova Scotia is the apple region par excellence, if you consider all the qualities that enter into apples, good eating qualities and good keeping qualities. I don't know whether there are any Ben Davis here or not, but you have Spies. A few weeks ago on a train in Central New York, a school master asked me what the origin of the apple was. I said I didn't know just where the apple came from and when, but that I had recently seen some apples that came from prehistoric lake dwellings in Switzerland, from the kitchen refuse that was thrown into the water below, and it was believed that these apples had lain there thousands of years. As I was explaining all this to the school master, a man whom I had noticed in front of us, leaned back, and asked—"Were those apples Ben Davis?"

You are all prepared to believe that of all the occupations and professions in the world, agriculture is the best. I ought to believe it; I was born a farmer; my father was born in this old Green Mountain state 86 years ago; he lives on a farm in the West today. My whole horizon is on the farm point of

view. One-third of all the people in the United States are farmers.

I want to bring to your mind that we are now developing different kinds of farmers; different kinds of ideas and enterprises, and one is the horticultural enterprise; fruits and vegetables. George Washington knew nothing of commercial horticulture. I have recently read his diaries containing correspondence had with overseers of his farms. When foreign representatives would call upon him he would ask them what plants grew in their gardens, and ask them to send him seeds. I don't remember that the word "horticulture" is mentioned. The garden is mentioned; the English idea of a garden but not gardening for profit. Washington knew of greenhouses that were used for the growing of plants for market; florists were not known as we know them today. He did not know what plants feed on. In one of his old letters he says some one had told him that he believed that plants lived on "acid." Washington said that was beyond him; he would have to leave that for others to work out. All these great enterprises have come up since Washington's time.

At the 50th anniversary of the Western New York Horticultural Society, organized in 1855, I was interested to see what the progress had been in all that time. There were two chief points of discussion at the first meeting held in Rochester. One was a long discussion on varieties of fruits; the different varieties of pears, apples, etc., and the other as to whether it would ever be possible to develop commercial fruit growing in Western New York. The larger part of the participants thought that fruit growing would likely become a commercial enterprise, and that men could make a living growing fruit; but this opinion was opposed by some who took the ground, that little fruit could be grown in Western New York until there was a market. At the present time, estimate, if you can, the number of men making money out of their fruit; just as much money as other men are making out of dairying. Since that time we have seen the rise of all scientific methods of horticulture, and scientific questions concerning the handling of the soil. In a fruit book of 1,000 pages, published in 1872, there is only one page on the apple soil for apples. Plant food, I think, is not mentioned in it. Nitrogen and phosphoric acid were not discussed; all these questions have now become common language.

We have come to the breeding of plants; a scientific process. Agriculture depends upon the increasing and maintaining of varieties in crops. This is brought about and is possible by means of fertilizing; tillage by means of rotation of crops;

by means of breeding new varieties. We are not breeding corn now so much to get a new variety to which we may give a new name, as to get a variety of corn that will contain the largest amount of starch or protein or oil.

I am merely going over these matters hurriedly and will leave them with you to impress upon your mind that horticulture has grown and has become a profession in itself.

At the convention in Western New York the exhibition of spraying machinery and other apparatus was so great that if a man who had been present 50 years before had dropped in and not knowing the progress made in the way of tools, he would have known scarcely any of those implements or what they were for.

Commercial practices have arisen within the 50 years. We have progressed from the wagon and the canal to the days of fast freight and express. We have seen the evolution of transportation of fruits and flowers and vegetables; we have seen the opening of foreign markets to our fruits; have seen the evolution of the cold storage; we have seen the special kinds of manufacture; the special products of wine and cider.

The canning factories have come; we have seen in the last 50 years the evolution of special schools for agriculture. And let me say to you right here, how glad I am that you are to have Morrill Hall; all honor to the man who set on foot an enterprise for the endowment of educational institutions the like of which have never been known in the world. And the great schools of the future; all these will have to do with the lives of men and be for the betterment of men. All schools and experiment stations have come in the last 50 years. These colleges had a long period of incubation; they did not make much progress at first; it was a difficult subject to promote, to bring agriculture into pedagogical form; it needed leaders; it has now become concrete, and you will see more ostensible progress in the next 10 years than you have seen in the last 50 years, because the work is now well in hand. We have seen the evolution of books on horticulture; we have seen the rise of the farmers' institute movement; we can trace it back at least to 1842, but it never became a definite, concrete movement until 20 or 25 years ago. The department of agriculture at Washington has come within recent years. The number of men who are employed in that department along these various lines of horticulture is very large.

Are there opportunities in horticulture? Yes, if you make them. I never yet saw an opportunity chase a man. Opportunities are very largely what you make them, but there are conditions that allow a man to make them and seize them.

I do not need to speak to you about Vermont apple growers. If you want to see successful apple growing, go up to Mr. Kinney's farm, or to the farm of some other Vermont men. You grow good apples; you have an apple growing country.

Is there success in horticulture? There is if you make it. If not, no. It all depends upon what your measure is of success. If your measure of success is merely the money you make, then, perhaps, farming is not the most successful profession in the world; but the horticulturist or farmer lives near to nature, and enjoys a strong, temperate, satisfied life.

In going to the meetings, I am always impressed to note the difference between the meetings of farmers and the meetings of men of other professions and occupations. The latter often strive to belittle other businesses and hold their own up as a money making enterprise. When I go to a farmers' meeting I find that they have a program which is not only going to benefit them, but all mankind. At the State Grange meeting held at Ogdensburg—from which place I came here—they were discussing "Good roads," "Rural mail delivery," "The election of senators by the people," and other public questions.

I believe in horticulture as an occupation. I am confident that there are just as good openings in horticultural pursuits right here in Vermont as there are in other kinds of agricultural enterprises; and if a man has the training and advantages and a desire to succeed and make and seize opportunities, his success will be as great as in any other profession. [The speaker cited numerous cases of successful practice in horticulture, and read some interesting literature.]

SOME OBSERVATIONS ON EUROPEAN HORTICULTURE.

BY L. R. JONES, UNIVERSITY OF VERMONT.

Mention was made of the evidence of the unprogressiveness in the south of Europe as compared with the more northern and western portions, illustrated by the training of grape vines upon a living tree as universally practiced in Italy, whereas from the moment of the passage of the boundary into Austria the trellis comes into use.

The thrift of the Germans is evidenced by the planting of fruit trees along highways. These are often planted and cared for by the school children, although they are usually the property of the community. Cherries are very commonly planted thus, and give bountiful crops of the finest table fruits,

which is sold on the tree at public auction. Is not this European practice worthy of introduction into this country? Apples are, however, inferior to standard American fruit, and the Europeans may well take lessons from us in their culture. In France, the ideal horticulture is found in the mushroom caves where every cultural practice is reduced to precision and every condition surrounding the plant is under the fullest control of the gardener. Moisture, light, fertility, temperature are all fixed or controllable factors. The one element of possible variability is the "spawn." The last thing to reduce this culture to scientific perfection will be the use of "pure culture" spawn, the methods of which have been recently perfected by our U. S. Department of Agriculture. The caves of M. Thore, near Paris, aggregating one mile in length, require the manure of 900 stable-fed horses, and yield 2,200 pounds daily of the daintiest white mushrooms.

An observation of more practical importance concerns the successful development in France of an ever bearing strawberry. The variety, "St. Joseph," originated by a French village priest in 1897, is being so improved and developed as to carry the fruiting season well through autumn months. Plants in the trial grounds of Vilmorin Andrieux & Co. were well loaded with flowers and green fruit as well as ripe berries in August, and the Paris markets were offering the berries then at reasonable prices, showing that the market gardeners are finding the culture practicable and profitable. Strawberry specialists in this country should hasten to profit from this French success and we shall hope to share in the gustatorial pleasures,

The most important part of the mission concerned potato culture and diseases and especially the matter of disease resistance in potato varieties. The interest in potato culture in Germany has been stimulated of late by the ambition, credited to the Kaiser, of producing potato alcohol so cheaply as to rescue his empire from the grip of the Standard Oil trust. Varieties of enormous starch production are being developed. In the British Isles the present interest is at fever heat in the matter of disease resistance as shown by some of their recently originated varieties. The most successful varieties today have been sent out by the Scotch breeder, Findlay, and the English firm, Sutton & Sons. Last year two pounds of Findlay's "Eldorado" sold at public auction at \$1,500.00, and even higher proportional prices were paid for smaller amounts. These were, of course, speculative prices, but as Mr. Findlay is now asking and getting 3 guineas (nearly \$16) per pound, there is fair margin for possible profit to the bold purchasers of the preceding year.

Seed of some seventy-five varieties were purchased under authorization of the Bureau of Plant Industry of the U. S. Department of Agriculture, including the most promising of these British varieties, and those reputed as disease resisters in France, the Netherlands and Germany. These will be tested in comparison with American varieties and used as a basis for further breeding and selection. This work will be in immediate charge of Professor William Stuart at the Vermont Experiment Station, and Mr. William Orton of the National Department will conduct similar trials at other points, south and west. It is believed that this work will lead to important results and furnish a basis for the even greater development of the production of hardy strains of northern grown seed potatoes.

MARKET GARDENING.

BY L. H. SHELDON, FAIR HAVEN, VT.

We are all more or less familiar with market gardening in Virginia, Texas, Florida, and Long Island, but who ever heard of the advantages of Vermont in that direction? In the few minutes of your time that I may take, I hope to show something of the possibilities and profit of developing the home markets of our State. I believe thoroughly in working the local trade to the greatest possible extent for the output of our farms.

If this society is helpful in educating our people to grow more fruit and vegetables, and to teach them how much more healthful, economical and satisfactory they are to use in our families, than the meats, canned goods and adulterated foods that we now so largely use, it will not have lived in vain. In our own case we have been surprised at the possibilities that we find opening up in the home market.

An enforced stay of four weeks in New York last fall, with leisure to investigate the fruit and vegetable trade, made me more than satisfied with our little business in the home town. In fact we had a little practical experience.

Our Wealthy Apples were too quick for us this season, and mostly fell to the ground. The remainder were hand picked, carefully graded, packed the best we knew how and shipped to New York. They sold for \$1.00, netting 35c per bbl. If we had paid 40c for our barrels, we should have had to adopt the old lady's reasoning who bought shoestrings at 25c per dozen and sold at 2c per pair, but she explained that she did a good deal of business. However, it is fair to say that the apples were on the road for a month. The windfalls were gathered into

barrels without much grading and sent to town in double wagon loads, the only instructions given the driver were not to let the barrels go. They sold at an average of 75c, not a large price, but much better than New York. Even our Ben Davis are sold and several customers have said they were very good. I think that shows that the home market is hungry for apples today.

An elderly gardener of our town who has gained a living and a good home at the business said to me not long ago, "If I had known as much about the profits of gardening years ago as I do at present, I would have been worth thousands of dollars against hundreds now." He did not think of the changed conditions within forty or fifty years. Some of us can remember the fruits and vegetables of those times. Canada peas for a few days, yellow field corn while in the roasting stage, ruta бага turnips, cattle beets and dried apples the balance of the year, about told the story. Again, people lived in the country then, now in the town. Also as wealth accumulates they are living better and more intelligently. In fact, the gardener has grown as fast as his market.

Can we grow vegetables successfully in this section of our country? I think it was with a gasp of astonishment that we read not long ago that the exhibition that won over the whole United State at St. Louis, was grown, perhaps, fifty miles from here at Glens Falls, N. Y. I believe it is now claimed that there was another Grand Prize, but I never could understand World Fair's medals. But it seems to be settled that there was nothing better than that exhibit.

How can we market our products? That is the great question. Many farmers seem to feel it beneath their dignity to sell their farm produce, others say they are no salesmen. Well I should be sorry if my enthusiasm should set every farmer at market gardening, though I might favor a divorce for his wife, and a law forbidding him to marry again if he failed to have a good home garden.

I have no great respect for the loss of dignity or position. In a certain farm paper, of which I was a patron, the editor had a habit of saying that "the farmer must have a seat at the first table." That talk does not appeal to me. I believe a man is generally invited to sit where he belongs, farmer or not, even though he sells fruit and vegetables, wholesale or retail.

Perhaps it may be helpful if you are given some details of how and what we market from our farm. While I shall speak particularly of vegetables, that is only one branch of our business. Our specialty is cake making, with a small proportion of canned fruits and jellies. Probably that is about the last thing you expected me to say. It has been developed entirely by Mrs.

Sheldon. The goods are sold by grocerymen in three towns. The sales last year were \$3,020, which speaks volumes for the home market if you have any good thing to offer. Dairying helps to maintain the fertility of the farm. We have used cottonseed meal as a fertilizer, but it is certainly more profitable to give the cow a chance at it first.

Apples, small fruits and, for the last two years, vegetables have been grown. We sell wholesale and retail, any way to keep things moving.

A market wagon should, of course, go out in the morning, but ours on account of the cakes goes in the afternoon. We have customers who expect us, others stop the wagon. We never cut prices on berries as such news travels fast; with vegetables, different sizes and conditions seem to make it allowable.

We advertise more or less. This year we aim to do it systematically, taking space by the year. Can you give any reason why the farmer should not advertise and push his trade like any other business man?

Our first notice read about like this: "Watch the Valley Farm advertisement. We believe in advertising, and the local market for the output of our farm. We have many good customers and friends in town and would like more. This space is taken for one year. It is not large, but we hope you will find many good things in it during that time. Just now we are cutting up some very fine Berkshire pigs, raised on milk, apples and corn, guaranteed healthy and all right. Now ready, Sausage, Head-cheese, and old fashioned spare rib roasts. Later, hams, shoulders and bacon. If tired of regular lines of meats you will find Valley Farm products a welcome change.

Telephone L. H. Sheldon, Prop."

Not much of a horticultural flavor there, but the pigs are a valuable assistant on the farm, and when our pork products are gone we will try to show people how much better it is that they should live on fruit and vegetables.

A very pleasant feature of our business is the summer cottage trade on the west shore of Lake Bomoseen. On the east side are trolley cars, boarding houses, Sunday picnics and saloons. We do not go there. The west side is being rapidly built up with cottages that are occupied by a very nice class of people that must needs buy everything they consume. This trade is in charge of our two boys, twelve and sixteen years old. They go two mornings in the week. Carry fruits of all kinds in their season and vegetables too numerous to mention, chickens, eggs, butter, and later Mrs. Sheldon found it a fine market for her cakes. The loads grew too large for one wagon

and several times two one-horse loads were sent. At the last of the trip they visit a large hotel whose proprietor is a close buyer and a kind of bargain counter remnant sale takes place. We count it a fine experience for the boys. The trade was not so very large this year, about \$300. We hope to double that another season.

A word about what we grow. We have had hot beds for two seasons, mainly to get plants for transplanting. Storm windows make good covers for cold frames in which to transplant tomatoes, etc. Prizetaker onions started in the hot bed, looked so fine when transplanted to a piece of perfectly fitted ground about two rods square that we got down to figures and put the value at \$50. However, while man proposed, the onion maggot disposed of about the entire lot. An application of salt seemed to give about the flavor they wanted. Sulphur seemed too much like the sulphur and molasses our mothers used to give us boys every spring to increase our appetites, and lime simply whitewashed the whole scandalous proceeding. At harvest time we reduced the \$50 estimate about \$48. Peas from first week in June to about September were profitable. In 1903, four rows of Scott's Earliana tomatoes, 3 rods long, escaped all the ills tomatoes were heir to that year and gave us a big crop that brought fully \$100. Last spring we sold \$25 worth of plants. Plants came by express and wagon loads and it seemed the town would be flooded with tomatoes, especially as it proved a good season for the crop. We had a much larger area than the year before, and it did not seem as if there could be anything in tomatoes. But the Earlianas got in first and we wasted very few tomatoes during the season though, of course, they sold at lower prices. We decided, anything you push, the market will take. Celery was a magnificent crop from July on. One-fourth acre late celery looked fine; we neglected to bank it; a hard freeze spoiled the outer stocks and we only had small bunches left. A little carelessness and mismanagement cost us perhaps \$75 on that $\frac{1}{4}$ acre. Cabbages were a fine lot, it did not seem as if they could ever be sold so abundant was the crop in sight. But they are sold except what we have trenched in for spring trade. Fairhaven is a roomy town, nearly every home with a large garden. Warm sandy land, the season was adapted to their best development. Seldom have the gardens been so good and yet we have been able to sell everything we raised in fruit and vegetables. Of course our business has been small compared to large gardeners, but the capacity of the home garden has surprised us. But the Yankee wants to know, is there money in the business? That depends on many conditions. We are very well satisfied. June, the time of the strawberries, was

our best month with farm sales of \$482, cake a little over \$200 brought the sales to \$700; July \$323; August \$291 and the cake up to \$360. Those were our best months. And furthermore the amount of good living for the family. Peas for three months; celery 8 monthhs in the year; vegetables of all kinds in their season are both healthful and economical. True we do not always get the first of the good things. When peas are 75c per peck; tomatoes 10c per pound, etc., it is quite common to have a scrap going on between Joe, who has charge of the garden, and the cook as to whether the family should have them or not. Joe, who cannot possibly save a dollar for himself, maintaining "dat we sell dose things." The result varies; if it was something near the house, easy for the girl to get, we had them; if she had to depend upon Joe we went without.

Do we like the business? Yes, as the berries like spring. Who does not long today for the breath of the south wind that shall loosen the icy fetters of the north? Who of us that does not have a God given instinct to get back to the soil? Within a couple of weeks the hotbeds will be under way. From that time there will be something of interest every day on.

A young man, son of a neighbor, left the farm to become a travelling salesman. He was successful at the business until nervous prostration sent him back to the farm to recover. The good salary tempted him to the position again. Once more he went to pieces. He likes gardening and fruits, but is almost afraid to venture, though he says there was not so much of that salary left after all with expenses out. He says my advice agrees with his inclination, so I think he will be a gardener this spring.

Two days ago a friend brought a young man to our home. I knew him well, a bookkeeper for years; his nervous breakdown was the worst I ever saw. Rarely have I seen a man suffering as he suffered. Of course I was quick with my remedy. Come right here and learn to care for our hot beds, work in the garden and drive my truck wagon. We will make health for you and money for us both. With an inexpressibly sad gesture he raised his hand to his forehead and said he, "I am all gone here. Too late, too late." All this suggestive of the old Greek fable of Ontaene in his struggle with Hercules, as often as thrown to the ground he received strength from his contact with Mother Earth to rise and renew the conflict.

From school and ball and root she came
The city's fair, pale daughter;
To drink the wine of mountain air,
Beside the Bear camp Water.

Her step grew firmer on the hills,
That watch our homesteads over;
On cheek and lip from summer fields,
She caught the bloom of clover.

For health comes sparkling in the streams,
From cool Chocorus stealing;
There's iron in our northern winds,
Our pines are trees of healing.

ASPARAGUS CULTURE.

N. E. JACK.

To begin with I would remind those of my hearers who contemplate growing asparagus as a means of livelihood, that in this as in many other vocations, there is no royal road to wealth, but one must be prepared for hard work and much of it; be prepared also for the emergency that when all his "help" leaves him, he is able to bend his own back and put in a strenuous day's cutting.

The amateur grower wants to first consider his market. Whether he is going to sell to the local trade, or, ship to some city or town, then ascertain whether that market prefers green, white or purple varieties. The writer knows instances where strong objections were made because a few stalks of "Columbian Mammoth" were mixed in a bunch of a purple variety. The consumer thought it was "not ripe!"

After consulting the taste of his customers it would be well to consult his own convenience and perhaps let some of his customers go, and plant the varieties that are least likely to rust. The best of these have so far proved to be Palmetto and Argenteuil.

In starting a bed two different methods are sometimes adopted. Planting the seed directly where one intends to have the permanent bed, thinning out the plants to one or two feet as they develop, and cultivating and keeping especially free from weeds the first three years of the young plant's life. By this method it is claimed that when the cutting season commences the plants are well established and can withstand the shock of the first year's cutting. The method most generally used is taking well developed, two year old "crowns" and planting where wanted. These crowns can be got from almost any reliable nurseryman or can be grown on the home farm. If the latter way is intended the seed should be sown in drills in rich

sandy loam soil, cultivated and kept free from weeds. Care should be taken not to sow the seed too thick to interfere with the growth of each individual plant. The plants should be kept in this "nursery" for two years, and by that time if proper care has been taken of them they ought to be well developed "crowns" ready to go into the field and start into the battle of life.

Preparation of the Bed—Much could be said in regard to the preparation of the soil, but I will confine myself to a few of the fundamental principles which are essential. Choose a well drained, rich sandy loam, with a clay loam subsoil. Always avoid if possible heavy clay, as this does not allow the roots to penetrate readily and is apt to be cold, which will retard the early production of stalks. On the other hand, it is not well to choose soil that has too many small stones in it as they dull the knife when cutting. A southern slope is to be preferred as this will induce early growth in the spring, for it is often this first "grass" which pays best. Care should be taken to have any low spot thoroughly underdrained, for asparagus, although a semi-aquatic plant will never thrive well in stagnant water.

In preparing the soil it should have a thorough top dressing of manure which must be thoroughly mixed in, and the soil pulverized to a depth of from eight to ten inches. After the bed is mellow and smooth one can mark out the rows with an ordinary drilling plow, the distance of the rows apart to be regulated as to whether one intends to cultivate between the rows by horse labor or by hand. Where the former method is intended six feet apart has been proved by experience to be the best. This distance allows the roots to spread well and is yet not too far to waste ground. After the rows have been drilled open, one should go along with a shovel, widen out the places where the plants are to be set so as to give the roots an opportunity to spread out in every direction. The "crowns" should be then set carefully in and covered with a few inches of earth. In selecting the "crowns" care must be exercised to select those which have many roots and few well developed buds, as this insures a thrifty plant with good large stalks, where if one has many buds and few roots they are apt to get inferior "grass." The trench should be filled in gradually as the stalks develop until all is level. The ground should be thoroughly cultivated and kept free from weeds, and the following spring get a heavy top dressing of stable manure. No "grass" should be cut from the plants for at least two years after being planted in the permanent bed.

In regard to applying commercial fertilizers, almost any fertilizer strong in nitrogen will give good results; but ex-

perience has proven that to give a couple of top dressings of nitrate of soda during the cutting season has been beneficial. It is well to consider when planting that the "crown" is built anew each season a fraction of an inch above the old one, and as a bed is expected to last many years, room should be left for new growth before the "crowns" will reach the surface of the soil, and be injured by cultivation. Rows are better when planted north and south, as in this way they get the full benefit of the sunshine.

Cutting and marketing are not the least important factors in asparagus culture, as one needs to exercise considerable patience and common sense in the former, and be alert to keep up with the commission man in the latter. When cutting, care should be taken to use a narrow bladed knife so as not to destroy the young shoots below ground. Those specially made for the purpose and sold by most seedsmen do the work very well. When inserting the knife into the soil, care should be taken not to start too far away from the stalk, as one is apt to injure any shoots that may be growing near, but the blade must be inserted about an inch away and should have such a shape as to cut the stalk about three inches below the surface of the soil. The stalks are then laid carefully in a basket, the marketable ones neatly in rows, and the inferior to one side for home use or canning purposes. This method saves time when bunching.

In regard to bunching I would not advise anyone who wishes to make a success of asparagus culture, to put it on the market in any other way but in bunches, the weight to be regulated by what that market demands. True, much "grass" comes into our market merely laid in baskets, but at best it is a slovenly method, and as a rule brings an inferior price, and gluts the market for the superior vegetable.

In buying a buncher, it is well to get one so constructed that the stalks can be put in quickly and from which the bunch can be slipped out without destroying the tender tips. The bunches should be filled just full enough so as not to crush any of the stalks and yet have the bunch firm when tied. As to the material used for tying I would not recommend a round string, as this has a tendency to cut into the stalks, but some sort of bark which gives a broader surface and will tie firmly, is to be preferred.

After the bunch is tied and before taking out of the bunchers the butts should be trimmed off evenly with a sharp knife. This gives it a neat, tidy appearance and allows it to stand up better on the market. When finished the bunches must be put into a refrigerator or some cool, moist, dark place until it is times to ship them to market.

For shipping, we find that a flat box with a little greater depth than the length of the bunch, and holding about three dozen bunches, is the best kind and carries the "grass" without breaking the tips and shows it off to advantage on the market. As far as commission men are concerned I leave others to explain. Our experience is that honest ones are few and far between, and it seems to me a pity that when our members of Parliament have been so far-sighted in enacting a by-law to compel the producer to put as good fruit into the middle of the package as is at the ends, that they could not also enact a by-law which would compel the middleman to be as honest as the fruit he is supposed to handle.

THE GROWING OF PLANTS AND CUT FLOWERS.

BY G. E. HUNT, RUTLAND, VT.

We are all most deeply interested in the work we have chosen as our profession. A sportsman talks of his dogs and guns. A farmer prides himself on the beauty of his stock and the fertility of his soil. Naturally a florist loves the plants which he grows for his pleasure and profit. Nothing is too good for them. He strives to supply their every need, and studies diligently that he may be able to guard them against disease.

There are many secrets to the profession, and, as a rule, I think florists are jealous of their knowledge; but, after all, the great secret is to look after the daily wants of your plants in a careful, business-like manner.

Many of our choicest flowering plants have been bred to such a state of perfection, along a certain line, that great skill is required to prevent a total collapse.

Of all flowering plants for the florist, the carnation is pre-eminently the leader. No flower compares with it in varied usefulness. In color, size, form, perfume, it is complete.

Its season of bloom is the longest. Shining forth in all its glory during the short days of midwinter. When cut it remains in perfection for days; even weeks.

It is appropriate for all occasions, from the bridal to the grave. For design work it is unsurpassed.

Its propagation and culture is not difficult, and it is tolerant of varying temperature and conditions.

Of its many varieties the Lawson stands easily first, and the enormous sum paid for the original stock was no act of frenzied finance, but only a shrewd business venture.

The remarkable and universal success attending the cultivation of this magnificent variety is proven by the statement that seven-tenths of the carnations grown are the Lawson.

I have before you a few flowers of different varieties, so that you may see the wonderful improvement which has been made in the last ten years.

These smaller flowers are fair specimens of standard varieties a few years ago. I call your attention to this fact so you will see the great importance of first selecting the variety to grow.

I have experimented every year with different varieties of the white carnation, but have never been quite satisfied. The standard of perfection has been raised so high by the pink varieties.

Different colors of the Lawson have recently been placed on the market, but none are quite equal in every respect to the parent.

The Enchantress is an excellent flower in size and length of stem, but is rather difficult to grow to perfection.

In the culture of carnations, of course, the first step is to root the cuttings. Many fail in this attempt, or only partially succeed.

I have purchased rooted cuttings, which had been stripped from a blossoming stem and planted in the sand without any further preparation. A cutting started in this manner is easier to root, but it will only root from the lower side; while a cutting broken a short distance above the stem will send out roots entirely around it. This is an important fact that is not known by many who have grown carnations for years.

Clear, sharp sand should be used for the propagating bench, and I find they root best in a cool shady part of the house without any bottom heat.

Many of our best growers plant their rooted cuttings in three inch pots, and early in the spring set the plants in the benches where they are to bloom the coming winter. This method is not always successful, and is much more expensive.

The usual method is to grow them out of doors during the summer and plant in the house sometime in August.

The diseases with which the florist must contend may be divided into three classes: Insect enemies, physiological disorders and fungous diseases. Insects are easily controlled. The aphides, or green fly, are destroyed by thoroughly fumigating once a week with tobacco stems, and the red spider is a small insect that must be carefully watched and kept under subjection by thorough syringing.

Physiological diseases are caused by disturbing functions of the plants from any cause. If the vitality of the plant is impaired in any way—its growth checked by unfavorable conditions of the soil; its constitution weakened by close and excessive heat or extreme cold; we at once see the effect in the bursting of the calyx, weak stems or sleepy flowers.

The causes of these troubles rest, to a certain extent, in the nature of the variety, but principally to conditions which we can control. In other words, keep the plants in a healthy growing condition, and we will have little cause to complain of this disease.

Fungous diseases are caused by distinct parasitic organisms, *Stem rot*—This fungus is found in nearly all soil, and its growth on the plants causes a rotting of the stem at the surface of the soil and ultimately results in the death of the plant. This is a very troublesome disease, for which we have no remedy. Some varieties seem to be badly affected, while others remain perfectly healthy.

The rose of course is a universal favorite, and while in its perfection is peerless among flowers, it quickly fades and its cultivation is much more difficult. It requires a house by itself, with a higher temperature than is congenial to most other plants, and the amateur soon learns that eternal vigilance is the price of roses. Disease and insect enemies beset their pathway from the cradle to the grave. Let him who is unprepared to spend sleepless nights and watchful days, beware of the *lovely rose*. The successful growing of roses is a trade that is mastered only after years of careful study and practice.

With bulbs it is very different. They offer the quickest and easiest means of securing an abundance of flowers and can be crowded in anywhere. I have forced twenty-five thousand bulbs in a single winter, growing most of them in boxes under the benches.

The bulbs are useless after they are through flowering, and are immediately taken up and thrown away, so that almost an unlimited quantity can be grown in a small house.

There is always a great demand for hyacinths, lilies, daffodils and tulips at Easter time, and the only great trouble is to get these in bloom just the right day. Nothing is more humiliating than to have a fine lot of bulbous stock coming in flower just after Easter. Be sure to have the bulbs planted in season; then their growth is regulated by the temperature to the hour.

Violets are not grown to any great extent by the average florist in small cities. That work is usually left to those who make a specialty of growing violets and nothing else.

Of the chrysanthemum, known of all men and everywhere admired, I need hardly speak. It is of course indispensable to the florist, and in its season, fills his house with a blaze of glory. One who has never seen a chrysanthemum house in its prime, can by no means realize the magnificence of the show. Solomon, in all his glory, was never so arrayed. Yellow, bronze, red and pink of every hue and shade, and balls of fluffy white, nod and glow and revel in the sunlight. One can hardly believe that such magnificence has been evolved by the florist's art from what at first was an insignificant weed.

The flowers I have mentioned are the principal ones grown by commercial florists for their cut flower trade, but of course, they require a great and a constantly changing variety of flowering plants. Collectors here and there and everywhere, from the arid hills of Mexico to the dark forests of far Cathay, are sending in continually some new thing. Some are good and some are not. They must all be tried, but the old stand-bys will not be easily replaced.

Now just a word about lawns. Lawns do not strictly come under the head of flowering plants or cut flowers, but lawns and flowering plants go hand in hand. Wherever you find one there is always a demand for the other. The lawn is the first symbol of regeneration; the first step in civic righteousness. There is no surer index of the degree of civilization, either of the individual or the community. The lawnless house, with its constant abominations: burdocks and bull-thistles; chickens and dirt and desolation; the unknown quantities in decaying compounds, is certainly fit breeding-place for all manner of diseases. On the other hand, the pleasant memories of childhood nurtured amid beautiful surroundings, will cling forever with a humanizing and ennobling appeal.

Here at Vergennes I seem at home among old friends. How often in the silent watches of the night have I seen again your pleasant streets and heard again your roaring waterfall. Here, of all the places I know, I would like to see the local improvement, already auspiciously begun, carried forward until Vergennes can justly claim to be the model city of Vermont.

SUNSHINE.*

BY GEO. W. PERRY OF CHESTER.

My subject, although a very bright one, is so simple and common that I imagine most of you have the same fear, which I have myself, that it cannot be made interesting or profitable. I suppose that many of you have an idea that I am going to treat it scientifically, and tell all about the chemical action of the sun upon the soil and plant, and talk about cell life, etc. All of that I will leave for the professors, hoping myself to speak in language intelligible to a child.

Isn't it queer that the things that are worth the most to us, and that are right around us every day, and which come to us without any effort on our part, we appreciate the least? We feel about the sunshine a good deal as did the Irishman, who said that he thought the moon was a great deal better than the sun, "For you know" he says, "that the moon shines in the night when we need it very much, while the sun shines in the day-time when it is already light enough without it."

If I were to ask a boy down here by the mill, "What is it that runs that mill?" do you know he would think I was guying him or that I was a fool; and, if he answered at all, would say, "Don't you see the dam over there? Water power runs it?" And yet, if he were to answer me correctly, he would say that the sunshine runs it. For the sunshine must pick up the water from the ocean and carry it up onto the hills and drop it down; and, in its struggle to get back to its native home, it pushes against the buckets of the water-wheel, and runs the mill. It is the sunshine, stored up in the trees and plants that lived countless ages ago, compacted into coal, that we liberate under our boilers to run express trains, drive our steamships, light our streets and run our trolley cars. It is sunshine that is the physical force of the whole earth, and electricity, light, heat and force are only different names for it.

Let us think that it must be the sunshine then that is the physical energy that builds up the tree, and makes the fruit that drops into our laps; and that it is the greatest factor of all in the production of that fruit. And yet, it is talked very little about, and thought very little about. We have learned of late years, to plant our apple trees at greater distances apart, and thin out the branches, so the sun can shine all around the tree,

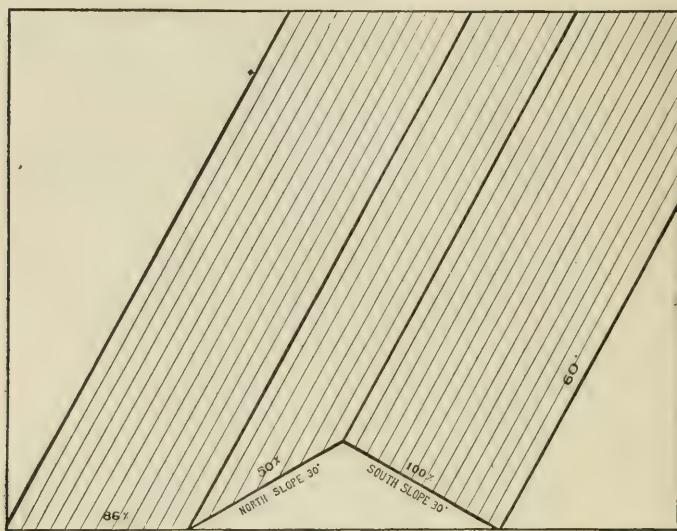
*NOTE.—Mr. Perry stated that although he was a resident of Chester all of his experience in fruit growing had occurred on the shores of Grand Isle, where he is a summer resident.

so that every part of the tree can have a fair share of its benefit. We have learned that by experience in selling our fruit; because you know that a northern spy as red as blood, creamy and crisp inside—like some of these on exhibition here—is the very best apple that grows, save one that is so scarce nowadays as hardly to be counted; while a northern spy grown in the interior of the tree, or where it was shaded by another tree, green on the outside and green on the inside, is the poorest apple save one, and I won't mention that in good apple company.

"But," someone says, "what's the use of talking about it?" We have no control over the sunshine, we have to take what we can get. It is about the same with other things, the soil and the water, which the trees and shrubs need. To be sure we can increase a little the fertility of the soil; and we can drain the land a little, if it is too wet, or irrigate, if is too dry, though we never do that in New England. But we don't set an orchard on a sandy waste and undertake to make it fertile or damp enough artificially. We select the piece of land that is best adapted to the purpose, that has the right kind of soil, we take the best piece we have and then help it all we can. So we can select on our farms, when we are about to plant an orchard, the field that is best located to catch the sunshine. I am aware that we are not accustomed to think much about that. Twenty-five years ago, in the State of Maine, where I then lived, they were beginning to advocate the planting of apple orchards on the northern slopes, because they would not dry up so much in the summer, and would not start so early in the spring. I don't know what the result is; but I venture to say that, though those trees may grow and produce fruit, the fruit will not be of good quality, it can't possibly be.

The most of our tillage land in Vermont lies down in the bottom of deep valleys; and, consequently, in many portions of the farm the sunshine is limited in quantity. But somewhere, on almost all of those farms, there are fields lying up in the broad sunlight all the day. In many places there are southern slopes, with springs of water, where the ledges are turned up edgewise, ledges of slate or limestone, so the water oozes out. If you set an orchard on such a slope, you may have to set it with a crowbar, but trees, especially plum and apple trees do love to get their feet down into the cracks of the rock, they do love to follow the seams down; the apples that grow on those trees will be rosy cheeked and of different flavor from those that grow on the northern slopes. Let me illustrate this by a bit of diagram. Suppose a hill slopes 30° —and there are many Vermont meadows that slope more than that—then the southern slope gets 100 per cent of it, the level land about 86 per cent, and

the northern slope gets only 50 per cent when the sun is 60° high, its height on a summer noon. If the sunshine is worth anything, we want all there is of it.



I undertake to say that from the time the tree is planted until its fruit drops into your basket, the most important item is the amount of sunshine you give it. Last year, with the exception of peaches, which do not really belong in this part of the country, we had a very abundant fruit crop, but the winter that preceded it was the severest on record. Yet we are fond of saying that it is the cold winters that spoil our fruit. The hardiness of the trees and the hardiness of the buds depend more largely upon the amount of sunshine they received the summer and fall before, than upon the mildness of the winter. A year ago last summer was a summer of sunshine, luckily for us. In the early part of the summer there was a little too much of it. And you remember those autumn days, bright, warm and glorious, extending the summer way over into November. Every tree was drinking it in and building up its tissue, and the consequence was, the ability to stand the winter.

Oliver Wendell Holmes was once asked, if he wanted to raise a good man, if he would not wish to begin young with him? "Yes," he said, "quite young." Well, how young was asked, how early do you think his training ought to begin? "Why," he says, "I should like to begin with his grandmother when she was a child." Every winter about this time I see

in some paper—and as like as not in some country paper at that—just after a week of warm weather, an item to the effect “that the trees are all budded.” We have lived here all of our lives among these trees, have seen them bud and blossom ever since we were born, and haven’t discovered yet that they bud the summer before, and the buds are there all winter.

Like Dr. Holmes, the tree begins early, if it wishes to raise a crop; it begins the summer before. While it is growing one crop it is getting ready for the next one, making its fruit buds and building up its tissue, and it depends upon the fortune it has in the summer and fall, whether we have a crop of fruit the next summer. I don’t know how early those buds begin to form, but very early. A year ago last summer all the apple and plum trees were getting in their stock of winter fuel, storing away the sunshine in wood and tissue, ripening up the new growth and filling out the fruit buds. If you had looked at the trees in October, you would have found those buds hard and solid with sunshine. They had put on their heavy winter flannels, and clad themselves in warm winter garments, and wrapped up their buds in thick furs, and were well prepared to spend the winter. When the wood is not well ripened and the buds half grown, it takes very little cold to kill them.

The ability of the blossoms to withstand the cold after they had started in the spring, also depends upon the amount of sunshine they obtained the year before. In 1902, the 10th of May, we stepped out of our house right into the winter. The water in shallow tubs had formed ice more than a quarter of an inch thick during the night. There was a heavy wind blowing from the lake straight onto our shore, and it continued to blow all day. The water was high, and the spray flew into the trees that lined our shores and over the rocks. The sun shone brightly all day, yet at night the rocks were coated with ice two or three inches thick, and all the trees were hanging with icicles as big as your arm, and hung there in the sunshine nearly all the next day. The apricot trees were in full bloom, the plum trees had about half of their blossoms open, the peach trees were just ready to open their flowers, and the pears and apples were beginning to show their color. We thought that the fruit crop was to be an entire failure; but it never hurt it at all, because the trees had made good preparation the year before, and all the organs in those blossoms were hard with sunshine. I have seen a field of corn where one stalk in a hill was left standing after a frost. Why do you suppose that stalk was left? That kernel of corn was better equipped, it had more sunshine in it, and was prepared to withstand the cold.

This is an item we should consider, and in setting an orchard we should select a sunny situation. Isn't it strange that we don't think more about that in horticulture? You would think a man a fool who would try to raise oranges in Vermont because he owned the land there, or who would build a hotel in the woods because lumber was cheap there. If we are going into the raising of fruit, we must ask where the best section in the world for the growing of that particular kind of fruit may be found? If we must grow it where we are, then we must select the best plot of ground we have. We are fond of saying that apples love water, because we have learned by experience that they do best on land adjacent to large bodies of fresh water, like that along the shores of Lake Ontario, Lake Michigan and in the Champlain Valley of Vermont. We give several reasons why the fruit grows so well in these favored locations. We say for instance, that the water tempers the atmosphere and prevents rapid changes; and so it does, there is no question about the benefit of that. In the Champlain Valley, which I know most about, in the winter the great mass of water, which is a little above freezing, keeps the superincumbent plane of ice very near to the same point, and this greatly modifies the temperature when the mercury has a tendency to go down to twenty below. And in the summer time, that great mass of cool water, which upon the surface never gets above 70°, except just along the shore, drags heavily at the winged heels of the little agile god of heat when he undertakes to climb into the nineties. Others say it is the soil, the limestone. Some think that it is the constant breeze that is blowing in that region that is to have the credit for the fruit crop. Sometimes it blows a little too much, and the farmers don't feel very kindly toward the wind, as they see so much fine fruit strewing the ground. Some say that it is the absence of a fog that makes this location suitable for apple growing. Let us give credit to all these things, but I venture to say that it is the amount of sunshine that falls upon these lands, more than anything else, that makes the trees produce so lavishly, and gives a high color and rich flavor to the fruit. The Champlain lies wide open to the sun, and all the orchard lands upon its islands and along its shores are comparatively level. Within ten minutes of the time set by Robert B. Thomas for its rising, the sun is already above the hills of the Green Mountains, and is pouring its flood of warmth and life down upon every acre of that land, and it continues to pour that flood of warmth and force upon that land until within five minutes of the time when it goes down with a bang over behind the Plattsburg barracks. As there is no fog, night or morning, there is nothing to obstruct the sun's rays. That is the most

remarkable thing about this region. During several years' experience, I have never seen a foggy morning in June, July or August.

I am not advertising any of this land for sale, but when the facts about it which I have spoken of are well known, it will be worth five times as much as it is today. I have often heard my mother say that when she was a child she often saw cows being pastured on what is now Boston Common. That was about seventy years ago. The time is coming when the people who succeed us in this Champlain Valley will no more think of pasturing cows and planting corn upon these orchard lands than the present Bostonians would think of doing the same upon their sacred common.

A friend of mine, a Scotchman, who came to America when he was quite young, a short time ago went back for a visit to that little town where he was born. When he returned the most important thing he had to say was this: the people took him out to show him a great curiosity, an apple tree. It was a little tree with about a bushel of fruit upon it, such as we sell for cider for five or ten cents a bushel. The owner of the tree was guarding the apples with great care; and, when asked what he was going to do with them, replied that he would sell them for four-pence a pound, and he did. That is \$12.00 a barrel. We sometimes wonder why the English people buy our apples. They have to, because they can't raise them. And they can't raise them because they have so little sunshine. If an Englishman is rich he sets a trap to catch what little sunshine there is. He encloses a garden with a high brick wall, ten or twelve feet high, so the sunshine cannot get out when it once gets in. Along the north wall of that garden he sets out a little row of trees, apples and pears and peaches, and trains them up against the wall, flattens them out as flat as a sheet of paper, so each tree resembles a fan. Thus they get a double supply of what sunshine there is, and he succeeds in growing a few specimens of very poor quality, which we wouldn't eat. He can raise wonderful gooseberries in his climate, and we can't in ours. I am willing that he should have the goose-berries, give me the Northern Spies. Therefore he must buy his apples of us. What is true of Great Britain is practically true of all northern Europe. Along the Mediterranean they have plenty of sunshine, but in that tropical climate they can't grow northern fruits; and so we have nearly all Europe for a market. For this is a land of sunshine, from the Atlantic to the Pacific, from Canada to Mexico, it is emphatically a land of sunshine.

How prone we are to look down under our feet for all of our blessings, and how little inclined we are to look up. We

are fond of telling about our great mineral resources. One man will figure up the billions and billions of gold and silver yet to be taken out of the soil. Another man speaks of the great deposits of iron that will make this the ruling nation of the earth. Others tell of the vast coal fields, or the great mines of copper, or the extensive quarries of granite and marble, such as we have in this State. In each case, the value of mineral runs into the billions. But add them all together, getting a sum that no human brain can comprehend, and I dare say that the sunshine that falls upon this land is worth ten times as much as the whole sum. We don't have to dig for it either, it comes down to us without the expenditure of thought. And we can't exhaust it, the people who live here a hundred years from now will find the supply just as great; and they may be heating their houses, driving their mills and running their trolley cars with the sunshine that we now let go to waste.

Then let us look up and thank God for the sunshine. And when we see it falling upon our fields as a heavenly benediction, let us remember that every shrub and tree that our hands have planted and our care has fostered is coining for us that sunshine into gold.

SMALL FRUITS FOR HOME USE AND FOR MARKET.

BY MRS. ETTA W. LE PAGE, BARRE, VT.

Every farmer should consider it an imperative duty to provide a bountiful supply of fruit for home use. There is no way in which he can produce so much value with so little labor and expense, as in a garden of small fruits. If the advantages of such a garden were fully appreciated, few farms would be without one. When properly started and well cared for, it is the source of more pleasure and enjoyment for the whole family than any other portion of the farm. A plot of liberal size should be set apart for this fruit garden. Let it be near the house, and long in proportion to its width. It should be rich in all the elements of plant food, especially phosphoric acid and potash. Plough deeply and harrow repeatedly. Thorough preparation of the soil will save much labor in caring for the plants, and greatly increase the crop. In outlining briefly some methods of culture, strawberries will receive the first attention, as it is from them we expect the earliest returns. Mark out the rows four feet apart, setting the plants from fifteen to eighteen inches apart in the row. This should be done as early in the spring as the ground is fit to work. Get thrifty plants

from a bed that has not borne fruit. If pistillate or imperfect blossoming varieties are used, set every third row with a perfect flowering sort that blossoms at the same time. Cultivate at least once a week all through the growing season. All cultivation should be level and shallow, and the best implement for the purpose is the fine tooth cultivator. Permit no fruit to grow the first season; all buds must be removed as fast as they appear. The first runners should be cut off: later ones allowed to grow to form a matted row. After the ground is frozen in the fall, cover with clean straw or marsh hay. In the spring when growth commences, rake this between the rows. to hold moisture and keep the fruit clean.

It seldom pays to fruit a strawberry bed the second time. It is much easier to set a new bed than to clean the weeds out of an old one.

Raspberries should be set early in the spring, in rows seven feet apart and three feet apart in the row. Cultivate frequently to keep the soil loose and the weeds down. Allow only five or six canes to grow from each plant, treating all others as weeds. Cabbages, potatoes or some other hoed crop may be grown between the rows the first year. A small crop of berries may be expected the second year and a full crop the third year. The old canes may be removed after the fruit is gathered, or can remain till the following spring. It is not best to cultivate later than August, as it may cause a late growth that will not ripen before winter. After the first season, a heavy mulch around the plants will hold moisture and smother weeds. Enrich each year; you must feed the plants if you expect them to feed you.

Blackberries should be planted and cared for the same as raspberries, and like them they will, if given good care, bear good crops for several years.

While the growing of berries for family use is easily done, to attempt to grow them on a large scale for market, without previous experience, is to invite failure. Experience is a very important part of a fruit grower's capital. Some of the requisites for success are, a liking for the work, good land, a good market, and the ability to obtain the needed help. Begin in a small way, gaining knowledge as you go, and never plant more than you can care for in the best manner. Take good horticultural papers and read them attentively. It takes head work as well as hand work to grow fruit successfully. That there is health as well as profit in it, I can testify from personal experience.

PRESIDENT'S ADDRESS.

G. H. TERRILL.

The Vermont State Horticultural Society meets for its tenth annual meeting, and with it comes, as it were, a new impetus, a new hope. For the first time in its life we have some money to do business with. A few have struggled hard to keep the wheels going, and though their courage sometimes faltered, yet from love of the cause a few have kept them rolling until in 1904 we asked the Legislature for a small appropriation and obtained at their hands \$500 per year. If we use any of it injudiciously we will lose such part so used. So it behooves us to see to it that it is wisely used. With this new inspiration, we as horticulturists, ought to be stimulated to encourage a large membership of those engaged in horticultural pursuits, and who should be interested in our work all over the State. Increased membership means increased interest in the business, a larger planting of fruits and flowers upon our hillsides and in our valleys, and more thought and care bestowed upon what we already have.

It seems to me that one of the things most needed by Vermont orchards in our best fruit section is fertility, and we should try and encourage the planting of legumes, such as clover, vetch, etc., to be fed to sheep or hogs in the orchards, or some other method of fertilizing, more largely than it is done at the present time. This method I believe applies to orcharding, the best of any line of farming in our State, and offers the best and cheapest means of keeping up fertility, and getting it back, where the land is smooth so it can be easily worked. We as a State, have many natural advantages, as we can produce fruit of the finest and best, and when we have raised it we have a climate to keep it in that is hard to beat, even by the best process of refrigeration in the country. Yet we are producing but a small amount as compared to what we ought, and as I believe in the near future, by the influence of this Society, the Press, the Experiment Station, the Board of Agriculture, and last but not least, the Grange, we will be doing.

We will soon see young men with trained minds and earnest hearts, grasping some of the advantages, and working out for themselves and those about them, under these favorable conditions as to soil, climate, temperature, etc., the problems yet unsolved. In the years that are past many of our best young men and women went to other states and engaged in other pursuits, and in many instances, have reflected credit on our good old Vermont as their birthplace; but I believe there are fewer

doing this today. The tide has begun to ebb back towards New England, and our land is going to be in better demand by these men who want to work out these new ideas, and people are learning to appreciate more and more the good climate, soil, water, etc., that is not excelled by any state in the Union.

Young men and young women, we honor your judgment. Where else can you find a better state to make a home; where else can you provide yourself with so much of the real comfort of home life for the same money value as here in Vermont, where land is comparatively cheap, where market facilities are good, good schools, good society, and the best of everything that goes to make life worth the living? Yes, we honor your judgment in making Vermont your home, and this society extends to you its greetings. It needs your enthusiasm and help, and in return pledges its support to you in the work of improvement and advancement.

Markets—Will the time ever come when the market will be crowded beyond its profitable limit in fruits? I believe not, for unlike most products, every sale of fancy fruit makes a market for more, and people will learn to consume more and more as the quality improves. I remember a friend some years ago visited California, and they were then planting very largely to fruit in that state, and he told me he asked his brother, with whom he was visiting at the time, "What will these people do with this fruit when these trees all come to bearing? The market will be flooded." And he said, "I have lived to see those trees all in bearing and the market is better than before." The market will be poor for the poorly raised and poorly packed fruit, but for the fancy grades there will always be a good demand and good prices will compensate those who produce that kind. Then let us do all we can to develop the true idea of advancement and ever strive to encourage the best endeavor of all who are planting and caring for these products of our soil. Not for the dollar alone, but for what it means in that higher development of manhood and womanhood, better and happier homes, purer and more noble lives and all that goes to make life the real and not the fancied.

In coming to Vergennes for this meeting, we came to the largest apple growing county in the State. We came to learn from each other, and get new inspiration in our work, that we may go home to do a year's work in 1905 a little, yes, a good deal better than the year just past. We came to you for this, yet not this alone, but that we might bring to you of Addison County, through these speakers from abroad and by this exhibit, ideas that might stimulate you to not only lead all the other counties, but that you might make such strides of advancement

along these lines, that you may easily hold your position you now occupy, and that you will be willing, yes, anxious to have us come to you again when we may see fit. So let us as a society, strive to so work in harmony and unison that we may have but one object, and that, the betterment of mankind and the fostering of those things that will help, not simply ourselves, but all the members of this organization, and everyone that is engaged in this work, and so honor ourselves and our State.

SOME RECENT AND IMPORTANT CHANGES IN THE BUSINESS OF FRUIT GROWING.

PROFESSOR F. A. WAUGH, AMHERST, MASS.

Mr. President, Ladies and Gentlemen:—

I wish in a word to express my satisfaction and pleasure in being able to meet with the Vermont Horticultural Society once more. It is always a pleasure to me to meet with any horticultural society, but when it is one with which I have spent so many days, and had so many pleasant experiences as this one, it is an especial treat, I can assure you.

I hardly know what my subject is. It is not necessary that I should make an address, and I wish that it might have been left out altogether. I would enjoy it more to come here and visit with you than to make a speech, for the speech spoils the visit.

The topic which I purpose speaking about is this, to talk over "some of the recent and important changes which have taken place in the business of fruit growing." For the most part we are inclined to shut our eyes to such changes; we don't realize they are taking place; we go on with our business as though this year was like last, and last year was like the one before. You know it is a matter of common reproach brought against many farmers, that they farm like their fathers and grandfathers did. It is a term of just reproach against some men, for we don't realize what great changes are going on, and how rapidly they are taking place. We are trying to use the experiences which men gained years ago, much of which experience is already outlawed, and I think you will realize when we come to count them up that what I say is true. We are making a great deal of progress, and making many changes. This change, of course, while we don't realize it, is now taking place, and is inevitable. There is no business which can stand still; it must progress or go backward. There are many reasons

why this is so, and if we wanted to, we could not stop horticultural progress; we could not prevent this progress. We must learn about it, and fall in with it, and keep up with the procession.

We talk about Systematic Pomology, that which treats of the different varieties of fruits, and their classifications; pomology which treats of the practice of fruit growing; commercial pomology, which treats of the business of selling fruit.

Our progress and our changes have been along those lines very largely. There are some of you here who were acquainted with Charles Downing and Marshall P. Wilder, the men who started the great horticultural progress in this country. Many of you have read the discussions of the American Pomological Society of 50 or 60 years ago, and I am sure you were impressed with this fact, that they talked almost entirely about varieties, page after page, telling about this variety and that variety. There was a certain reason for that. The country was new; new varieties were brought in; local adaptations had to be studied out. The whole force of the horticultural discussion was put upon systematic propagation.

Then came the era of practical pomology, of fruit growing. That is within the memory of all of us. Then men studied how to grow fruit; they learned about spraying and other things; all calculated to grow better and more fruits, and all emphasis was put upon that.

And then in recent years the emphasis has passed to commercial pomology, to the sale of the fruit after it is grown. At some of the meetings where I have been, the time was entirely taken up with the discussion of selling fruit; everybody knew how to grow fruit; the question was to get rid of it.

Generally you will see that is the order; first the fruit, (the varieties) then how to grow them at a profit, and then how to sell them. Of course a man must know all these things to succeed at the present time. We are expected to know all and I suppose we do.

Now let us look more particularly to the business of fruit growing, and I will point out the particular changes that have taken place. First there is the matter of varieties. Of course, we don't grow the same varieties that we did 50 years ago; or, at any rate, we don't grow many of the varieties. There have been a great many changes in the catalogues of recommended varieties; a great many varieties have been suppressed—done away with. There are many varieties they used to cultivate in Vermont, and which now you could not find in the State, not even a specimen. Then there are some varieties which we called commercial varieties when I came to Vermont, and which are

now almost unknown—the Yellow Bellflower, which Mr. Kinney used to grow—he doesn't grow them any more; and the Pound Sweet apple. We don't have them. We grew many varieties that have been suppressed, taken out of the list altogether. A few varieties have been added; just a few, one the McIntosh, a new variety, a commercial one; there are very few varieties that have recently been brought into commercial propagation.

We may notice that the relative importance of varieties has been shifted. I can remember 10 years ago, we supposed the Greening was one of the best of our commercial apples. As cold storage came to be of such importance we found the Greening did not stand storage well, and scald developed. We did not know anything about that a few years ago. When that trouble came up it diminished the importance of the Greening, and today you do not find as many as you did 10 years ago. I remember the first meeting of this Society that was held in Burlington, which was 9 years ago last fall—a pretty creditable institute considering the circumstances—I think one-third of the apples there were Rhode Island Greenings; yet there are few of those here today, compared with other varieties. The Baldwin is of less importance, relatively, also, and the Ben Davis is of more importance than 10 years ago; 10 times as many are raised as 10 years ago, and I believe 10 years from now there will be still more, and I am not recommending them either.

As to the methods of growing, one of the first in which we may notice a change, is a tendency to growing the trees closer together. The speaker who preceded me told you we learned some years ago to put them further apart. Since that time we have learned to put them closer together. We want to use all the sunshine there is; put as many trees on an acre as you can grow there. While the fruit growers of this country were acting on the theory, 10 or 15 years ago, that trees should be planted 40 and 50 and even 60 feet apart, they are now planting them 35 feet apart, and some even closer than that. There are a great many things to be said along that line. First, I would call your attention to another development of that close planting idea. Land is getting valuable. These people up here in Grand Isle want \$100 and \$125 an acre for this apple land. It is worth every cent of it. One of the speakers has said to you that it will be worth four or five times as much. The land is valuable, and one can't afford to have acres of that land lying idle while an orchard grows up. If you plant an orchard of Baldwins or Greenings or Spies, it is 10 or 15 years before the ground is occupied. The first five years the trees do not occupy half the ground. You can't afford to do that and pay taxes, so something must be done to use that land. Of course, some

men used to seed it down to grass and have a meadow, but one day they found out they must take better care of the soil, and stopped that. I saw a photograph the other day of one of the finest orchards in New York State, planted 30 feet apart, now standing 60 feet apart, and practically the ground is all occupied; about two-thirds of the trees have been cut out. I know people who wouldn't cut out trees, but a reasonable man will do it. In some places some men are undertaking the double planting of their orchards, by putting in other trees such as peaches and plums. On a little farm where I practice we have a nice orchard of that kind, which is planted to apple trees 40 feet apart, and rows between of peach trees, which bring the peaches and apples 20 feet apart. The peach trees have been in fruit 6 years—the last two years have been too cold for a crop—but there have been three crops of peaches, any one of which would pay for the land for the entire time. That is a good deal for a man who is trying to carry on this business successfully financially. Last year some apples were sold, enough to pay for the care of the land; but up to the present time the thing was an expense if it hadn't been for the peaches. The peach trees have not yet hindered the apple trees in the least and it seems safe to leave them there for four or five years longer. If they begin to injure the apple trees' growth, then they will come out; we are there to take them out when they are in the way.

I was in an orchard in Maryland not very long ago, run by a very practical man, who is planting orchards on a large scale, and is making something out of it. He had put dwarf pear trees between the rows. They come into fruit the second or third year, and give him a revenue.

There is a change in the matter of pruning. Now our trees are subjected to more severe treatment. This has to be done if a man has a large number of trees to an acre; he must keep their growth in hand. If you go into Mr. Kinney's orchard you will find he is pruning more severely than he used to; now he keeps the trees—or tries to—from growing so large. I have had the pleasure of visiting orchards of Hale, the peach grower, especially his Georgia orchard. In that country they used to say that peaches should be planted 30 feet apart. Hale went down there and planted his 13 feet apart; he had an orchard of 1,000 acres of peach trees 13 feet apart. The trees left to themselves would swamp the whole field in a short time. You couldn't get through it with a mule team. But Hale doesn't allow the trees to grow that way; he cuts them back very closely every year. There are many things gained by that. It is very much easier to pick the fruit, and the trees are never climbed into; the fruit is all picked from the ground, and that is a saving of expense.

Of course peach trees will submit to a more severe pruning, than an apple tree, but an apple tree will bear more pruning than we have been giving it. We are now feeling that it ought to be done, and has got to be done, if we go on planting so large a number of trees to the acre.

Spraying—There is no necessity of entering into the changes along this line. Spraying has been established within the last few years. Why, almost everyone here can remember when spraying was a new thing, just introduced. I can remember the different experiments that have been made, but now it is an accepted thing.

Tillage—A great change has come to the fruit growing business in what you might call tillage. I can remember when many of the orchards in the Champlain Valley were in grass; but you will all recognize the injury it did the orchards. All the new orchards are now in cultivation.

I think I ought to make one remark to throw a side light on that business of tillage. We used to suppose that cultivation was done in order to kill the weeds. We have learned now that tillage has a more important office than that. The breaking up of the soil makes a reservoir for water; it liberates fertility. So the tillage of the soil helps the trees. We don't look upon tillage as a weed killer, but the tillage of the soil in the summer in an orchard helps to save the moisture and it helps the trees.

Fruit package—Perhaps the first thing we have to notice with respect to fruit selling, the commercial pomology, is that it is more important than it used to be. Fruit used to be grown incidentally by many of the farmers. If there was a little fruit to sell, well and good. Now it is a profession; and most of the fruit growers are making it the leading part of their business. They grow by the best methods and produce the best article. The amount of fruit used has been doubled and trebled in the last few years. The extent of the market has been very greatly increased. The first changes, and perhaps the most marked changes, have been with regard to the packages used. Perhaps I had better confine my remarks to apples, although as a matter of fact, greater changes have taken place in other fruits. In the first place we had to secure a barrel, even that doesn't go back of your memory. The time was when almost anything that would hold apples to carry down to the grocery store, would go. Even now up in Canada, they haul apples to market in a cart, and dump them into a car, and shovel them as they do coal. I have seen that done in Addison County not very long ago. But we got away from that some years ago and adopted the barrel. That was a change, a great change, from that dump cart method to the barrel. Then more recently came the box.

Apples for the last five years have been placed in boxes; that matter was accepted more readily than we expected and here we are with apples boxes everywhere in the markets and a part of the regular business. We have pretty nearly settled down and sobered up and adopted these boxes. You know what the apple box is—a box that holds a bushel, approximately—not a heaping bushel—a box measuring 10 x 11 x 20—a standard box though it has not been legalized by any legislature as yet. I am not recommending boxes or comparing them with barrels. The barrel has its place, and the box its place. I don't believe we are going to get away from the barrel, but we will retain the box.

Another subject is that of a smaller package than the bushel box. In all the retail markets in the last year where I have been, I have seen the common four quart basket, just such as the Georgia people ship their peaches in. I don't believe I visited a single retail market in Washington or Boston but what I saw apples in those four quart boxes on sale. For the most part, growers did not put them in those boxes, they were placed there by the dealers; but it shows there is a demand for such packages, and the fruit grower is going to fall in with that demand and furnish a smaller package. In New York, the last year or two, apples have been sold by the dozen; this requires some new style of a package. I have seen them put up in paste board boxes, like eggs. We have got to think up some sort of a scheme for handling them in that way. We are, therefore, entering upon another change in fruit packing.

Storage—Probably the greatest change has been the development of the cold storage industry. We used to keep apples in the hay mow or put them down cellar, and various other ways, some good and some bad. Apples will keep well in a hay mow, and they will keep first rate in a good cellar, if they are good apples and properly put in. Then we came to the development of special houses built for that purpose, like Kinney's which have been most successful; but for the last four or five years the cold storage houses have been developed. Since that time we have learned a great deal about handling apples. Now we can handle them with great safety, seldom losing any, when they are put in in good condition. They are taken out in no better condition than we put them in, but they will not be apt to be spoiled badly. Every year there are more and more apples put into cold storage. Perhaps we have nearly reached the limit of cold storage in this country. That has been a great development in the last five years, and has had a great influence upon the sale of the fruit.

I believe it is a fact that there is a greater confidence in the apple market than there was a few years ago. I can remember

when commission men were regarded as thieves. The men who packed the apples had no particular confidence they were going to get anything for them when they shipped them. The trade was not settled. The shippers did not trust the sellers, and *vice versa*. I think you will agree with me that the situation is much better as regards Vermont, and I believe in all apple growing districts. The shippers have more confidence in the sellers, and that is a change which I believe is very important, perhaps one of the most important.

Foreign trade—Another change relates to the foreign trade. We shipped last year to Europe something like three million barrels of apples; five percent more than ever before. This year we won't come up to that. That foreign trade can be greatly enlarged. Out of all that shipment nine-tenths of the fruit went to the British Isles, a country supplied from other sources. Germany and France and Central Europe are to be supplied. Some of it, especially Central Germany, is an apple growing country, the land is as good as in Grand Isle; they have the sunshine and the soil, but they don't seem to know how to grow apples commercially. They don't know how to plant an orchard and bring it up to commercial development, though I can't see any reason for it. If I had the money I would go to Central Germany rather than to Grand Isle. There is a market already waiting; and fruit grows there in profusion.

I would not preach so long a sermon without pointing a moral. There are practical applications to what I have said, I hope. I hope you will realize after we have gone over all these things and have seen how these different things have changed in the last eight or ten years—not in fifty or sixty years—but in the last ten years, these great changes have come, I think you will realize when you think of it, that these changes did not stop last year, nor this year—they are going on, perhaps more rapidly in the future than in the past. It means we have got to hustle to keep up with the procession, and that we must be watchful every moment, to know what all the improvements are, and work them out on your own farms, or we are going to get left. You can pick out twenty-five men in every neighborhood that have got left. They may be all right running for the Legislature or something of that kind, but no good in growing apples. I suppose there are horticulturists that come here year after year to keep up to date, and if you go back ten years in the history of the society you will see it has meant something to you, and has meant something to your neighborhood. It doesn't seem, sometimes, that anything has been accomplished, only to have a good time, to get acquainted and feel more friendly with the members, and after all, when you get home and the cow kicks

the milk pail over and things all go wrong, we can't see how we are any better off. But I don't see for my part how any man can look back over the last ten years and fail to see that great things have been accomplished. And if we have any optimism at all, we will feel that the next ten years will give us something even better.

THE STRAWBERRY.

BY W. T. MACOUN.

There is no doubt but that the strawberry is the most popular fruit we have, and it is a fruit that we can now get on our markets in nearly every month in the year. We get them in Ottawa from February until the following August. They are raised in greenhouses in some places and these afford the winter crop. The strawberry is just as popular in one season as in another. For instance, when the raspberries commence to come in, strawberries will sell just as well as in the first of the season, in fact better. Our strawberry growers on Prince Edward Island are taking advantage of this fact, and as their fruit ripens later in the summer, even in August, they ship to Boston markets, with great success, their season is later than ours. There is a good market for this fruit because it prolongs the season.

Professor Jones was telling us about the "everbearing" strawberry they have in France. We have tested it at Ottawa, but it doesn't suit this climate. Our summers are too hot and dry. The strawberry instead of throwing out additional flowers, as it does there, and keeping on fruiting, simply ripens and doesn't go on flowering. As a result we found by the test, that it was not worth growing. Of course, some years when we have had a very wet fall some other varieties of strawberries fruit in August and September. I would not advise any berry grower to pay large prices for the "everbearing" variety for this climate.

There is one great advantage to those who are going into the culture of fruit, in beginning with strawberries, because one can go into strawberry growing with very little capital. It is not necessary to have much money to start strawberry growing, and one can make enough in one season, on a very small area, to cover one's expenses, and be able to increase the plantation next year. It is possible to grow 14,000 boxes of strawberries to an acre; but a good average crop is from 5,000

to 6,000 boxes, but we have actually gotten on a small area about 30 feet in length, at the rate of 14,000 boxes to the acre. If you have a small area and intense cultivation, it is possible to make a lot of money out of it. The difficulty is in trying to cover too large an area. We don't give time enough to one crop. When we become strawberry specialists we are able to increase the crop very much indeed.

With regard to the best soil for strawberries. I may say that in this country the strawberry succeeds best in warm, sandy loam, as rich as you can obtain it. The strawberry is one of those fruits which will not go to wood; there is no danger of injuring it by giving it too much fertilizer. Some kinds of fruits you have to avoid giving too much fertilizer, but with the strawberry, the more fertilizer you can give it the better. I have never found anyone who has complained about not getting a good crop of strawberries where he has his plantation heavily fertilized. The more fertilizer you put on the land the better the crop will be.

Moisture is one of the most important factors in successful strawberry culture. You can understand how important this is when one remembers that just when our strawberry is in full bearing, or in full fruiting season and ripening well, we have usually a very dry spell. If your strawberry plantation is on soil which bakes easily or dries out, the crop will be shortened very much. So, in planting your strawberry plantation, take into consideration that we have to look into the question of the dry spell and the ripening time, and we want to know whether it is possible to keep the moisture in the ground at that time to prevent the soil from baking. It is only by having loose, rich, moist soil that we can bring these things about.

In regard to the preparation of the soil: unless the soil is in fine condition, we are apt to lose a great many plants when they are set. It is well before-hand to prepare the ground very thoroughly, so as to get the soil into fine particles, so when we set the plant in the ground the soil will come in close contact with the roots. It frequently happens that when soil is not properly prepared, and is lumpy when we set the plants out, the soil does not come in contact with the roots, and when the drouth comes it dries up and we lose our plant. It is important to have the soil fine. And I may say that in manuring the soil for strawberries, this must be taken into consideration and fresh manure should not be ploughed into the soil in the spring when you are about to set out the strawberry plants. It leaves the soil too open and the plants are liable to dry out, just as I have mentioned. We prefer rotting the manure well. We have a large pile in the winter, which will now shortly be turned, and

then turned again a little later on, and by early spring it is well rotted, and this is well worked into the soil before setting the plants. It has been our experience, the best time to plant is early in the spring as soon as we can work the soil readily. The reason being that at that time the air is moist, the soil is moist, and the strawberry plants are more liable to take hold very quickly.

You can't have very good success by planting in the summer or early fall unless you are a strawberry specialist and can give your attention to the plants; as you know in the fall or late summer we are very liable to have a drouth, and that is very hard on the strawberry plants.

By planting the strawberry plants about the month of April it is possible to get a good growth of plants by autumn.

We find the most economical system for general cultivation is to set about 18 inches apart and the rows from $3\frac{1}{2}$ to 4 feet apart; by setting them at that distance we have a row in autumn at least 2 feet wide, and filled with plants, and these should give you a crop the following season.

You were told this morning to pinch off any flowers which appear on the plants after they are set. This is very good advice in most cases, because any strength which goes from the plant before it is properly rooted is going to injure the plant, because sometimes if the plant is not properly rooted before dry weather comes it may suffer and perhaps die.

We prefer taking off the first runners if we can, but it is not a very important matter. At the time the first runners appear, the plants are usually well established, but if there is a dry time it pays to take off the first runners, and get the old plants well rooted, so that afterwards they will make a great many runners, which is necessary in order to get good strong plants.

There are a great many systems recommended for growing strawberries, the matted row, the hedge row, and the hill system being the principal. We have found for general culture the ordinary matted row system is the most economical. But if a person is making a business of strawberry culture and can give his time to it, some of the other systems, which require the placing of the plants at a certain distance apart, and limiting the number, are advisable. These special systems are sometimes better because you will get larger berries by having fewer plants. If you have a large mat of plants the berries will not be quite as large, but when you are sending your berries to the general market you are not catering to people who want large berries and berries of especially fine quality. I think it is better to have a matted row, 2 feet wide and renew the plantation every year;

take one full crop off the plantation and then plant another new one wherever you have the ground. In this way you avoid the difficulty of contending with weeds, which I think are on every farm; the longer you leave a strawberry plantation the more weeds there are.

It is very important in this climate, in the State of Vermont, to protect the plants in winter from change of temperature. Now if we were sure of a covering of snow all winter, from autumn to spring, and that there would be no sudden changes of temperature in the spring, it would not be necessary. In some winters a covering might do more harm than good, but this is not often the case. What the covering does is this: By putting it on in the fall after the ground freezes hard, you protect the plants from any sudden changes in temperature which may take place when there is no snow on the ground. You know it very often happens we don't have a hard freeze until after Christmas, and sometimes don't have snow until then; and sometimes frequent thaws, and sudden changes in temperature; these are all hard on the plants and liable to kill them; by having a covering, like straw, which is the best; just a light covering, it protects them from these sudden changes and leaves the plants in a frozen condition. We have found that coarse straw is about as satisfactory to use as anything, unless you can get marsh hay, and I think that is best. It is coarse and doesn't lie close to the plants. You can understand, if the straw lies very close to the plants it is liable to cause heating in the spring, unless you are very careful to remove it at the proper time. In Prince Edward Island, where a late market is so important, they are making a practice of leaving the covering on as long as possible. This delays the growth of the plants, and delays the ripening of the fruit, and they are able to prolong their season in this manner. We have to be careful not to leave this covering on too long. If we leave it on a little too long it will mold and do more harm than good. Our practice at Ottawa is to leave it on until there is growth outside, until the plants begin to show signs of growing, and then we take the covering off. We leave it on as long as possible, because sometimes even in May there will be frosts, and the strawberry is very liable to suffer in the flower bud in those early frosts; even when the bud is scarcely through the ground it will be injured by a slight freeze in the spring. We have paid particular attention to this the last two years when the May frost came, and found when they were injured that they were simply coming through the ground, the inner parts of the flower, namely the pistils, were all destroyed, all brown. Of course the fruit would not set when this

had occurred. It is important to leave the covering on as long as you can without danger of the plants molding.

The mulch when taken off is just put between the rows, so as to retain the moisture during the summer, and prevent the soil from dirtying the fruit, and also to make it more easy for the pickers to keep them out of the mud, and to keep the fruit clean. We make no effort to cultivate between the rows at all.

In regard to the varieties—The following are among the best. The Sample, a variety which cannot be too highly spoken of, and a comparatively new sort; a very handsome fruit, bright red in color, symmetrical in shape, looks well in the box. For the benefit of those who do not understand, I will say that plants are of two kinds; for instance some varieties only produce imperfect flowers. If you plant a Sample by itself you can get no fruit unless an odd flower happened to be perfect. It is important to get a variety which is perfect to grow next an imperfect one. The perfect flowered variety will set fruit by itself; does not require any other around it. It is necessary to have perfect and imperfect in order to get the two to fruit. To show you that it is important to have some imperfect varieties, but of twelve varieties here named there are eight of them perfect and four imperfect kinds, and I think the most attractive is the Sample.

The Buster we have found very satisfactory; we distributed some of these a few years ago.

The Bisel, another pistillate.

The Warfield, a well known kind, not a large variety, but very productive.

The Glen Mary, a perfect variety.

The Greenville, an imperfect variety.

The Enhance, a perfect variety. I may say the Enhance is a most productive firm berry; it is a great shipper.

The Bederwood, another perfect kind. If I were to plant a plantation of strawberrnes, I would use this. It is one of the best for supplying pollen. It is necessary to have a variety that will supply others with pollen in order to get a perfect crop. The Bederwood is one of the best for this purpose. It is a little bit early for fertilizing the Sample, but will do so as it flowers for a long time. I would prefer the Lovett for fertilizing the Sample.

Bubach, a very large berry, and one of the best for home use, both productive and large and of good quality. Does not make very many runners, and for this reason I prefer it to some of the others which mat up very thickly.

The Williams is another good variety for long shipping; it is very firm and very productive.

These are some of the very best berries which we have tested; we have a warm, sandy loam soil.

The Crescent is a very productive berry, but becomes small, it is a pistillate variety: requiring another kind to furnish pollen. If you plant the Crescent also plant the Bederwood.

DISCUSSION.

E. G. HUNT, VERGENNES, VT.

I have raised strawberries right here in Middlebury for 25 years, and I have tried almost every variety that has been advertised. I have never found anything to equal the Crescent. It grows large enough for market; is about the same size as the Sample, not very much difference. I fertilize it with the Cumberland and the Triumph. I grow it for my own use in preference to any other. For my conditions these two berries are the only berries that I want.

As to the protection—I have never found any benefit at all from it—that is a local matter entirely—some of my neighbors protect their plants, but on my soil it does more harm than good. I have hardly any trouble from winter-killing. I raise about 250 bushels a year; supplying Middlebury and Vergennes.

L. H. SHELDON, FAIR HAVEN, VT.

My experience as to the size of berries is that I had rather have a medium sized berry. But in selling them, everyone prefers the large berries.

REPORT OF COMMITTEE ON RESOLUTIONS.

The Vermont State Horticultural Society desires to place on record at this its tenth annual meeting:

1st. Its cordial appreciation of the welcome it has received from the people of Vergennes and its gratitude to all whose efforts have contributed to the pleasure and profit of the meeting.

2nd. It extends thanks to the railroad companies, who by the granting of reduced fares have increased the attendance.

3rd. It acknowledges with pleasure its debt to the able speakers who have addressed the different sessions, and in particular expresses its pleasure at the presence and aid of the men from across the border, who as speakers and judges have done so much to make the meeting a success.

4th. With hearty sincerity we express our gratitude to the last legislature, which by a liberal appropriation has made it possible for the association to continue its work on behalf of the horticultural interests of the State with renewed courage and assured prospects of success.

5th. We congratulate the entire people of this State, whatever their occupations, upon the appropriation which will assure in the near future a building upon the campus of the State University, devoted to instruction and investigation in the various lines of agriculture, worthy of the State and of the man whose name it is to bear.

6th. Since the box as a package for apple shipment is coming more and more in favor, this Society recommends as a standard for Vermont a box 10 in. by 11 in. by 20 in.

ERNEST HITCHCOCK,	} Committee.
D. C. HICKS,	
E. S. BRIGHAM,	

PREMIUM LIST.

[In making out a premium list, it was thought best, owing to lateness of the season, to restrict it to such varieties as would most likely be available, hence the absence of all early kinds.]

APPLES.

	1st	2nd
Plate Arctic	\$1.00	\$.50
" Bailey Sweet	"	"
" Baldwin	"	"
" Bellflower	"	"
" Bethel	"	"
" Ben Davis	"	"
" Blue Permain	"	"
" Bottle Greening	"	"
" Fameuse	"	"
" Gillflower	"	"
" Hubbardston	"	"
" Jacob Sweet	"	"

" King	"	"	
" Mann	"	"	
" McIntosh	"	"	
" N. Spy	"	"	
" Nodhead	"	"	
" Ontario	"	"	
" Peck's Pleasant	"	"	
" Pewaukee	"	"	
" Red Canada	"	"	
" R. I. Greening	"	"	
" Roxbury Russet	"	"	
" Scott Winter	"	"	
" Shiawassee	"	"	
" Spitzenburg	"	"	
" Wagener	"	"	
" Wealthy	"	"	
" Wolf River	"	"	
" York Imperial	"	"	
	1st	2nd	3rd
Best collection of apples	\$5.00	\$3.00	\$2.00
Best exhibit of apples in packages.....	5.00	3.00	2.00

PEARS.

	1st	2nd
Plate Anjou	\$1.00	\$.50
" Bosc	"	"
" Clairgeau	"	"
" Diel	"	"
" Lawrence	"	"
" Winter Nelis	"	"

FLOWERS.

	1st	2nd	3rd
Best display cut flowers (professional).....	\$5.00	\$3.00	\$1.00
" pot plants	5.00	3.00	1.00
" cut flowers (amateur)	2.00	1.00	
" pot plants (amateur)	2.00	1.00	

NOTE.—Plates of apples and pears of any variety must contain five specimens in order to compete for a premium. Competent judges will be appointed to judge the exhibits.

FRUIT EXHIBIT AND AWARDS.

Notwithstanding the lateness of the season and a lack of preparation on the part of the members of the Society, the fruit exhibit was a very creditable one. The judges, Messrs. W. T. Macoun of Ottawa, Can., and Wm. Craig of Abbotsford, Que., made the following awards:

Bailey Sweet—G. H. Terrill, Morrisville, 1st.

Baldwin—F. E. Foote, Middlebury, 1st; L. G. Whitford, Vergennes, 2nd.

Bellflower—E. S. Bristol, Vergennes, 1st; L. Putnam, Cambridge, 2nd.

Ben Davis—L. G. Whitford, Vergennes, 1st; L. Putnam, Cambridge, 2nd.

Bethel—F. E. Foote, Middlebury, 1st; T. L. Kinney, So. Hero, 2nd.

Beach—T. L. Kinney, So. Hero, 1st.

Blue Pearmain—S. W. Smith, Addison, 1st; L. Putnam, Cambridge, 2nd.

Bottle Greening—F. H. Miller, Halifax, 2nd.

Fallawater—L. Putnam, Cambridge, 1st.

Fameuse—L. G. Whitford, Vergennes, 1st; L. Putnam, Cambridge, 2nd.

Gilliflower—T. L. Kinney, So. Hero, 1st; S. W. Smith, Addison, 2nd.

Golden Russet—T. L. Kinney, So. Hero, 1st; G. H. Terrill, Morrisville, 2nd.

Holland Pippin—S. W. Smith, Addison, 1st.

Jewett Red—F. H. Miller, Halifax, 1st.

King—E. S. Bristol, Vergennes, 1st; Luther Putnam, Cambridge, 2nd.

Ladies Sweet—T. L. Kinney, So. Hero, 1st.

Mann—E. S. Bristol, Vergennes, 1st; L. G. Whitford, Vergennes, 2nd.

McIntosh—L. G. Whitford, Vergennes, 1st; L. Putnam, Cambridge, 2nd.

N. Spy—L. G. Whitford, Vergennes, 1st; E. S. Bristol, Vergennes, 2nd.

N. W. Greening—Luther Putnam, Cambridge, 1st.

Rambo—S. W. Smith, Addison, 1st.

Rubicon—R. H. Bristol, Vergennes, 1st.

Roxbury Russet—Mrs. R. E. Robinson, Ferrisburgh, 1st; E. S. Bristol, Vergennes, 2nd.

R. I. Greening—R. H. Bristol, Vergennes, 1st; F. E. Foote, Middlebury, 2nd.

Salee Russet—T. L. Kinney, So. Hero, 1st.

Seek-No-Further—S. W. Smith, Addison, 1st.

Scott, Winter—L. Putnam, Cambridge, 1st; G. H. Terrill, Morrisville, 2nd.

Spitzenburg—F. E. Foote, Middlebury, 1st; S. W. Smith, Addison, 2nd.

Steele's Red—T. L. Kinney, So. Hero, 1st.

Sutton—T. L. Kinney, So. Hero, 1st.

Swaar—S. W. Smith, Addison, 1st; T. L. Kinney, So. Hero, 2nd.

Tinmouth—E. S. Bristol, Vergennes, 1st.

Tolman Sweet—F. E. Foote, Middlebury, 1st; T. L. Kinney, So. Hero, 2nd.

Twenty Ounce—F. H. Miller, Halifax, 2nd.

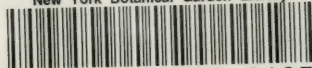
Walbridge—T. L. Kinney, 1st.

Wealthy—T. L. Kinney, So. Hero, 1st; L. Putnam, Cambridge, 2nd.

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